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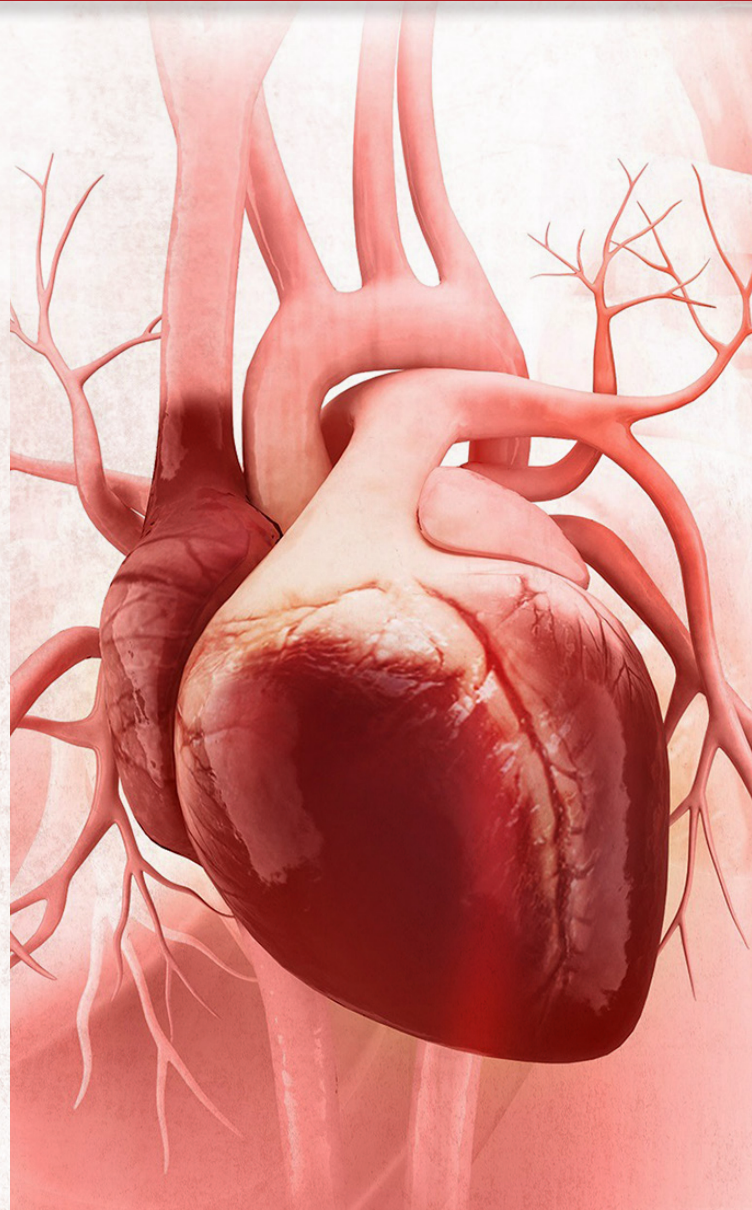
INTERVENTIONAL CARDIOLOGY PERSPECTIVES

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ORAL PRESENTATIONS

[OP 01]

Antegrade Wire Escalation and Dual-Lumen Microcatheter-Assisted Parallel Wiring StrategyUğur Aksu¹, Cüneyt Kocaş²¹Department of Cardiology, Afyonkarahisar Health Sciences University Faculty of Medicine, Afyonkarahisar²Department of Cardiology, Biruni University Faculty of Medicine, Istanbul

Aim: Antegrade wire escalation is one of the fundamental crossing strategies for CTO lesions with suitable anatomy. A true-lumen-to-true-lumen crossing approach is particularly desirable in cases with a well-defined proximal cap, a good-quality distal target vessel, and a relatively short occlusion segment.

However, successful penetration of the proximal cap does not necessarily translate into successful crossing of the entire CTO segment. When the guidewire repeatedly enters a side branch or progresses into the subintimal space, simply increasing penetration power may result in repeated advancement along the same incorrect pathway. In such situations, a parallel wiring technique in which the first wire is maintained as an anatomical reference may be considered. Dual-lumen microcatheters can facilitate this technique by allowing a second wire to be advanced from a different angle without losing the position of the first wire.

We present a case of an initially relatively manageable LAD CTO that became challenging because of loss of directional control during antegrade wire escalation and was successfully recanalized using a SASUKE dual-lumen microcatheter-assisted parallel wiring technique.

Case Report: A 67-year-old woman was evaluated for persistent refractory angina despite optimal medical therapy. Her medications included acetylsalicylic acid, metoprolol, atorvastatin, ranolazine, and nitrates. Coronary angiography demonstrated an LAD CTO, with the distal LAD filling via Rentrop grade 2 collaterals from the RCA (Figure 1). The occlusion was short, and the J-CTO score was calculated as 1.

A bifemoral approach was used. The left main coronary artery was engaged with a 7 Fr EBU guiding catheter, while the RCA was engaged with a 7 Fr JR guiding catheter. Dual injection was performed to delineate the CTO anatomy and assess the distal target vessel.

A potential microchannel was initially explored using a Fielder XT-A supported by a Corsair Pro microcatheter; however, penetration could not be achieved. The wire was therefore escalated to an Ultimate Bros, which successfully crossed the proximal cap. However, the first wire repeatedly entered a diagonal branch and could not be redirected along the LAD axis despite repeated manipulation.

A second wire was then advanced toward the LAD. Control injection from the RCA demonstrated that this wire had entered the subintimal space (Figure 2). Despite repeated manipulation, distal true-lumen re-entry could not be achieved.

As continued wire manipulation repeatedly resulted in advancement along the same incorrect pathway, the decision was made to change the strategy rather than pursue further wire escalation. The Corsair Pro was exchanged for a SASUKE dual-lumen microcatheter, and a parallel wiring technique was initiated (Figure 3).

The first wire was left in place and maintained as an anatomical reference indicating vessel geometry and the incorrect pathway. An Ultimate Bros 3 was advanced through the second lumen of the SASUKE. By taking advantage of the different exit angle provided by the second lumen, the wire was redirected toward the LAD axis and successfully advanced into the distal true lumen (Figure 4).

After the intraluminal position of the wire was confirmed in cranial projections, the CTO wire was exchanged for a standard workhorse wire. Following adequate lesion preparation, drug-coated balloon angioplasty was performed. Final angiography demonstrated successful LAD recanalization with TIMI 3 flow (Figure 5).

This case highlights the importance of distinguishing successful penetration from successful directional control during CTO crossing. Although the proximal cap had been successfully penetrated, the first wire repeatedly entered the diagonal branch, whereas the second wire progressed into the subintimal space. These findings suggested that the main challenge at this stage was not insufficient penetration but rather loss of directional control.

One of the key principles of contemporary CTO crossing algorithms is early strategy modification when meaningful progress cannot be achieved with the current approach, rather than indefinitely repeating the same maneuvers. In the parallel wiring technique, a wire located in an incorrect plane can be maintained rather than removed, thereby serving as an anatomical reference and helping prevent the second wire from following the same pathway.

Dual-lumen microcatheters provide an important technical advantage in this setting. They allow the position of the first wire to be maintained while enabling a second wire to be directed through a separate lumen and at a different exit angle. The EuroCTO expert recommendations identify parallel wiring as one of the principal applications of dual-lumen microcatheters in CTO PCI.

Recent clinical data also support this approach. In a recent analysis from the PROGRESS-CTO Registry involving 1,353 CTO PCI procedures in which the initial antegrade wiring attempt was unsuccessful, dual-lumen microcatheter-assisted parallel wiring was associated with higher technical success compared with the conventional parallel wiring technique. However, these data are observational, and the potential effects of patient and lesion selection as well as operator preference should be taken into consideration.

In our case, the use of the SASUKE dual-lumen microcatheter enabled the first wire to be maintained as an anatomical reference while allowing the second wire to be redirected toward the LAD axis from a different angle. Thus, rather than further increasing penetration power, the strategy focused on regaining directional control, ultimately allowing successful crossing into the distal true lumen.

Conclusion: Successful penetration of the proximal cap during CTO PCI does not guarantee straightforward completion of the procedure. When the guidewire repeatedly enters a side branch or progresses into the subintimal space, the mechanism of failure should be reassessed rather than persisting with the same strategy.

Dual-lumen microcatheter-assisted parallel wiring, in which the first wire is maintained as an anatomical reference, may represent an effective bailout strategy in selected antegrade CTO PCI cases in which penetration has been achieved but directional control has been lost.

Keywords: Chronic total occlusion, CTO PCI, parallel wiring technique, dual-lumen microcatheter, antegrade wire escalation

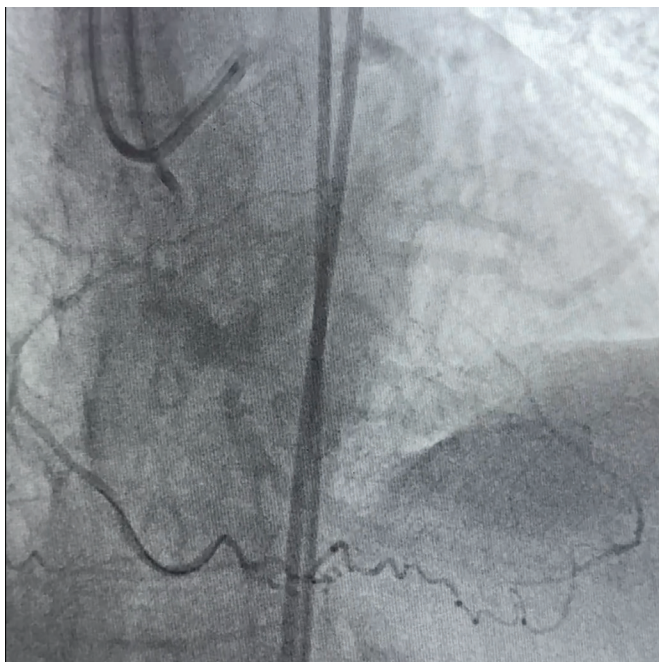


Figure 1. Baseline coronary angiography demonstrating the LAD CTO and collateral filling of the distal LAD from the RCA

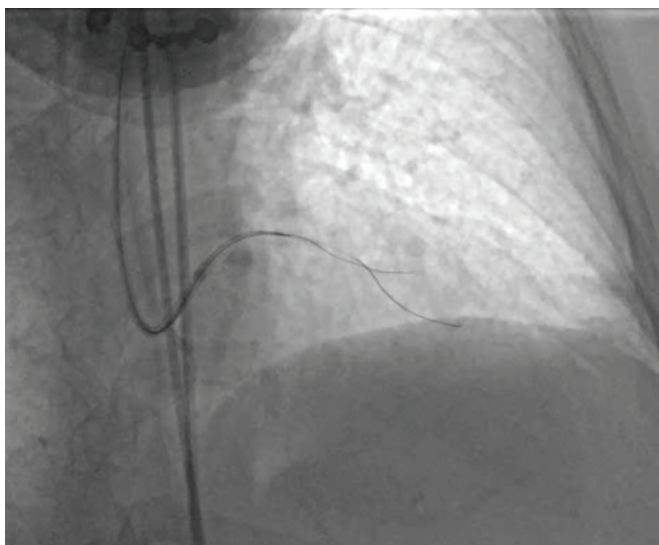


Figure 2. Guidewire entry into the diagonal branch during antegrade wire escalation and subintimal progression of the second guidewire

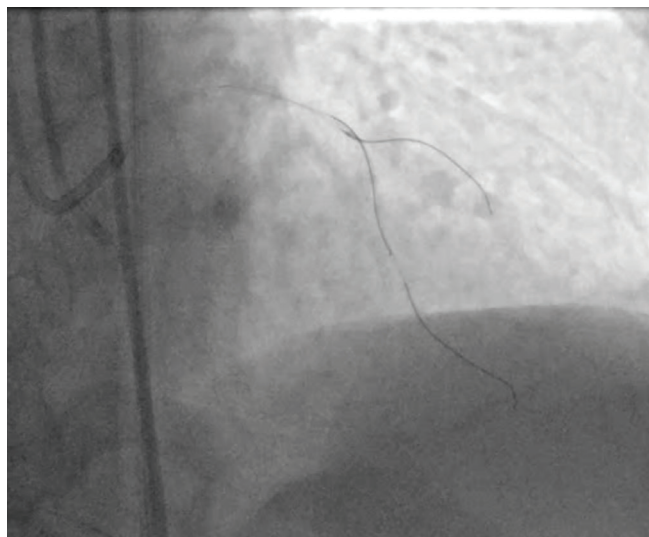


Figure 3. Parallel wiring technique using a SASUKE dual-lumen microcatheter

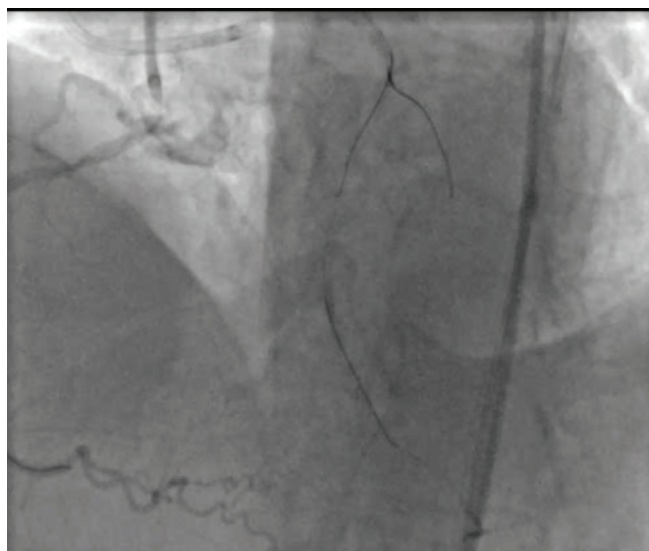


Figure 4. Successful crossing into the distal true lumen with the second guidewire

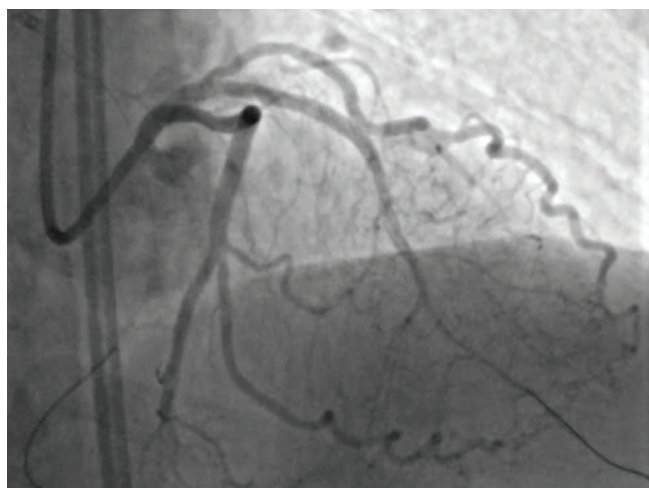


Figure 5. Final angiographic appearance of the LAD following drug-coated balloon angioplasty, demonstrating successful recanalization and TIMI 3 flow

[OP 02]

CT and IVUS-Guided Stumpless CTO PCI with Hybrid DCB

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Aim: Stumpless CTO PCI requires accurate delineation of the occluded vessel and proximal cap. CCTA defines vessel course and calcification to guide wiring, while IVUS facilitates cap puncture. These complementary imaging modalities support a tailored hybrid intervention incorporating drug-coated balloons and selective drug-eluting stenting to limit stent burden in diffuse disease.

Case Report: A 65-year-old man with hypertension and dyslipidemia presented with longstanding exertional chest pain relieved by rest. Resting ECG, routine blood tests, and renal function were normal. Coronary CT angiography demonstrated proximal LAD occlusion immediately beyond a large first diagonal branch (D1), with limited calcification. Invasive angiography confirmed a stumpless LAD CTO with diffuse downstream disease and minimal RCA collateral filling (Rentrop grade 1); the remaining coronary arteries were normal. Stress cardiac MRI demonstrated viability in all left ventricular segments and moderate-to-severe inducible ischemia (>10%) in the LAD territory, supporting the decision to proceed with CTO PCI. PCI was performed using dual radial-femoral access. IVUS positioned in D1 identified the LAD proximal cap at the 3-o'clock position and adjacent fibrocalcific plaque with a calcium arc of 90-180°. Following an unsuccessful workhorse-wire attempt, IVUS-guided puncture with a microcatheter-supported Fielder XT-A enabled proximal cap penetration. Contralateral injection helped assess the wire course, and distal LAD access was subsequently confirmed by microcatheter injection. After sequential predilatation with semicompliant and scoring balloons, IVUS demonstrated diffuse fibrocalcific disease and a small mid-LAD intramural hematoma. A hybrid strategy was selected, combining stenting of the proximal-to-mid LAD with drug-coated balloon treatment of the remaining distal disease. A 3.0×38-mm drug-eluting stent was implanted and optimized with a 3.0-mm non-compliant balloon distally and a 4.5-mm balloon proximally. Repeat IVUS confirmed satisfactory apposition and expansion, coverage of the hematoma, and no distal medial dissection, with a minimum stent area of 5.04 mm². The remaining mid-to-distal LAD lesion was prepared with a 2.5-mm scoring balloon and treated with a 2.75×30-mm drug-coated balloon, overlapping the distal stent edge and inflated at 6 atm for 60 seconds. Final angiography demonstrated TIMI grade 3 flow without residual stenosis, thrombus, or dissection. At one-year follow-up, the patient remained free of exertional chest pain.

Conclusion: In stumpless CTO PCI, CCTA and IVUS provide complementary information for overcoming proximal cap ambiguity. CCTA delineates the vessel course and calcium distribution, allowing the crossing strategy to be planned beyond the angiographic silhouette. This rationale is supported by the CT-CTO randomized trial, in which preprocedural CCTA increased successful recanalization from 84.0% to 93.5%. IVUS translates anatomical planning into procedural guidance by identifying the proximal entry point and directing guidewire advancement in stumpless occlusions. The value of imaging extends beyond crossing to determining where permanent scaffolding is necessary. Distal vessel narrowing may reflect negative remodeling that partially reverses after recanalization; IVUS helps distinguish this from substantial residual disease, informing treatment extent and device sizing. This distinction is particularly relevant in long, diffuse lesions, where extensive stenting risks treating segments that may subsequently enlarge. A hybrid strategy addresses this concern by combining DES where mechanical support is required with DCB treatment of suitable, adequately prepared segments. PICCOLETO X supports the feasibility of this approach, but operator-selected treatment and the absence of a DES-only comparator limit conclusions about comparative efficacy. Accordingly, this integrated approach rests on anatomical assessment and lesion preparation, while its incremental clinical benefit remains unproven.

Keywords: IVUS-guided, percutaneous coronary intervention, chronic total occlusion, stumpless, hybrid strategy

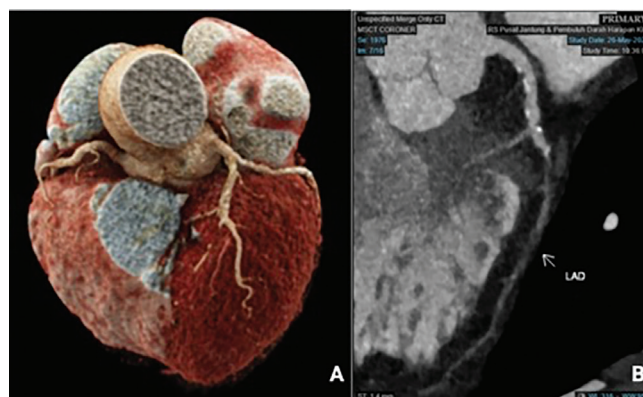


Figure 1. Coronary computed tomography angiography showed CTO LAD after diagonal

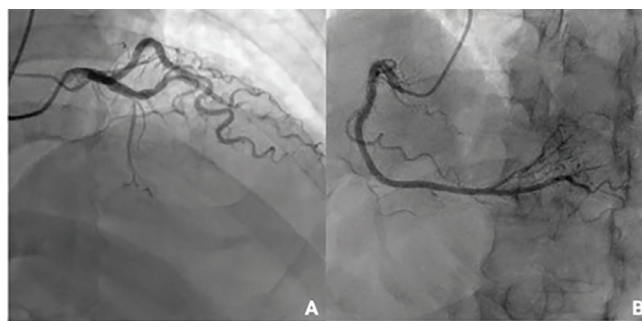


Figure 2. Diagnostic angiography. (A) CTO of left anterior descending artery (B) right coronary artery

Summary	
Normal LV volume with normal LV systolic function (LVEF 59%); hypokinetic at mid anteroseptal, apicoseptal LV	
Normal LV mass with normal LV wall thickness	
Normal LA volume	
Normal RV volume with normal RV systolic function (RVEF 53%); global normokinetic RV	
Mild TR	
No myocardial inflammation	
Ischemic scar with viability at mid anteroseptal, apicoseptal (LAD)	
Moderate-severe (>10%) stress-induced ischemia at basal-mid anteroseptal, apicoseptal, apico anterior (LAD)	
Clinical impression :	
CAD with viability at all LV segments and moderate-severe (>10%) stress-induced ischemia at LAD territory	

Figure 3. MRI stress summary

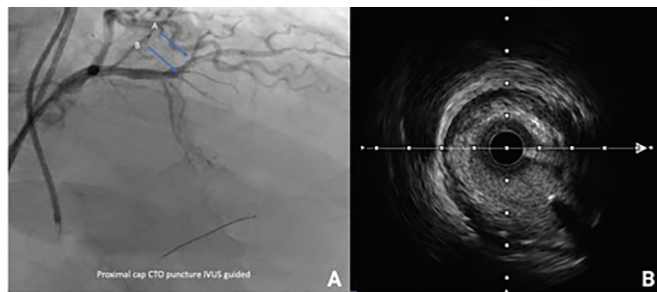


Figure 4. IVUS-guided puncture



Figure 5. Final angiography

[OP 03]

Successful Antegrade PCI of Ostial Right Coronary Artery Chronic Total Occlusion in a Patient with Dextrocardia

Abdul Basit

Interventional Cardiologist, Peshawar

Aim: Chronic total occlusion (CTO) intervention in patients with dextrocardia is technically challenging due to altered cardiac orientation and coronary anatomy. We report successful antegrade PCI of an ostial right coronary artery (RCA) CTO in a patient with dextrocardia using radial access and dedicated CTO techniques.

Case Report: A 47-year-old morbidly obese patient presented to the outpatient department with shortness of breath on exertion. Baseline electrocardiography demonstrated features suggestive of dextrocardia, prompting further evaluation. Coronary angiography revealed an ostial CTO of the RCA.

The CTO lesion was classified as complex, with a J-CTO score of 3. Due to the altered anatomical orientation associated with dextrocardia, careful angiographic assessment and catheter selection were required.

Percutaneous coronary intervention was performed through radial arterial access. An amplatz left (AL) 1 guide catheter was used to achieve adequate coronary engagement and support. An antegrade crossing strategy was selected. The CTO segment was successfully crossed using a Pilot 200 CTO wire.

Following successful wire crossing, lesion preparation was performed sequentially with:

- 1.0 mm semi-compliant balloon
- 2.0 mm semi-compliant balloon
- 3.0 mm semi-compliant balloon
- 3.0 mm non-compliant balloon

Two drug-eluting stents were implanted (3.0×35 mm and 3.0×38 mm). Final angiography demonstrated TIMI III flow with no residual stenosis. The procedure was completed successfully without complications.

The patient demonstrated clinical improvement following PCI with improvement in symptoms after revascularisation.

Conclusion: CTO PCI remains one of the most technically demanding areas of interventional cardiology, requiring careful lesion assessment, appropriate strategy selection, and dedicated equipment to maximize procedural success. The J-CTO score is an established tool for predicting CTO crossing difficulty and incorporates angiographic characteristics that influence procedural complexity. Contemporary CTO algorithms recommend individualized selection of antegrade wire escalation, dissection/re-entry, or retrograde approaches depending on lesion morphology and operator experience.

Patients with dextrocardia present additional technical challenges because of altered cardiac position, reversed coronary orientation, and difficulty with conventional fluoroscopic views and catheter engagement. Successful PCI in these patients requires adaptation of standard techniques, careful angiographic interpretation, and appropriate guide catheter selection.

In this case, despite a complex ostial RCA CTO with a J-CTO score of 3, successful revascularization was achieved using a radial approach with an AL 1 guide catheter and antegrade crossing with a Pilot 200 wire. Sequential balloon preparation followed by implantation of two drug-eluting stents resulted in restoration of TIMI III flow without residual stenosis or procedural complications.

This case demonstrates that CTO PCI can be performed effectively in patients with dextrocardia when anatomical challenges are recognised and standard CTO principles are appropriately adapted.

Keywords: Dextrocardia, chronic total occlusion, right coronary artery, CTO PCI, antegrade wire escalation

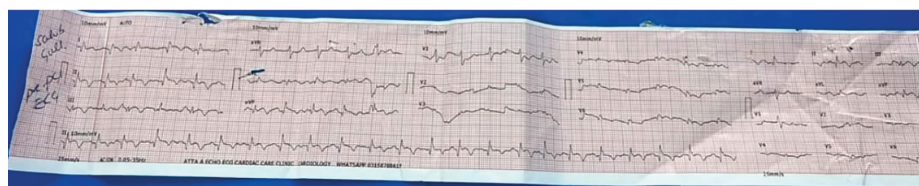


Figure 1. Baseline electrocardiogram demonstrating features consistent with dextrocardia

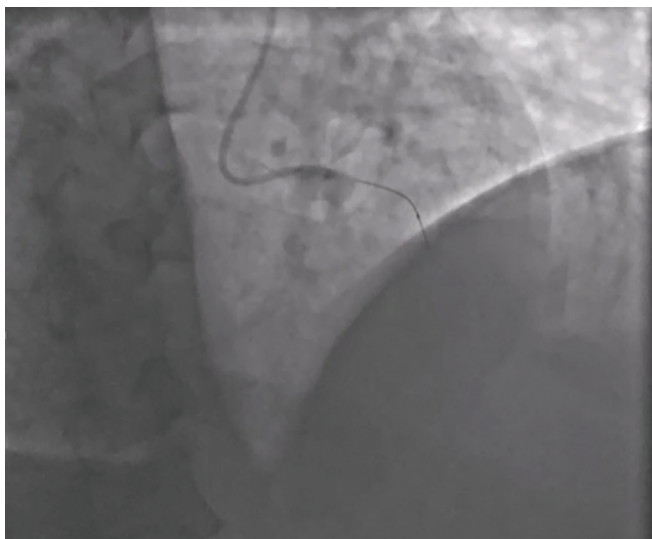


Figure 2. Coronary angiography showing ostial right coronary artery chronic total occlusion

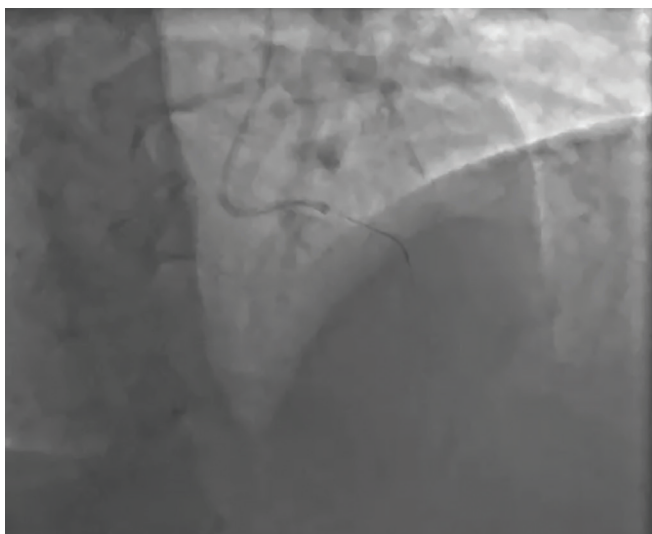


Figure 3. Antegrade CTO crossing using Pilot 200 wire through the occluded RCA segment

CTO: Chronic total occlusion, RCA: Right coronary artery

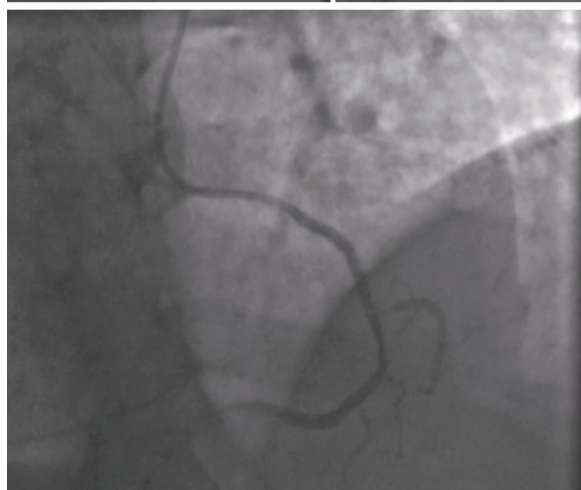
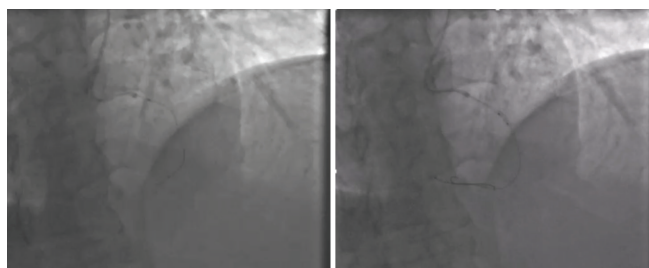


Figure 4. Sequential lesion preparation with balloon dilatation followed by stent implantation



Figure 5. Final angiographic result showing patent RCA with TIMI III flow and no residual stenosis

RCA: Right coronary artery

[OP 04]

Two Prior Ostial Stents, Two Problems: Difficult Engagement and Donor Artery Dissection in a Flush Aorto-Ostial In-Stent RCA CTO

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Aim: Chronic total occlusion (CTO) percutaneous coronary intervention is considerably harder when the occluded segment contains a previously implanted aorto-ostial stent, and reported success rates in this setting are lower. The target is a stent lumen rather than a vessel lumen, and guide catheter coaxiality becomes the variable that decides whether an antegrade approach is feasible at all. We describe a right coronary artery (RCA) case in which a flush ostial in-stent CTO made engagement the first obstacle, and in which a previously implanted left anterior descending artery (LAD) ostial stent that had not covered the proximal plaque set the stage for a donor artery dissection during the retrograde attempt. The bailout steps are reported alongside.

Case Report: A 50-year-old man was referred for revascularization of an RCA CTO after Canadian Cardiovascular Society class III angina persisted on optimal medical therapy. He had hypertension, hyperlipidemia, and a 20 pack-year smoking history. One month earlier he had been admitted with non-ST-elevation myocardial infarction and the proximal LAD lesion had been treated: predilatation with 1.5×15 mm semi-compliant (SC) and 3.25×15 mm non-compliant (NC) balloons, then a 3.5×24 mm drug-eluting stent. Neither post-dilatation nor proximal optimization (POT) was performed, and the stent ended inside the ostial plaque. Laboratory values were unremarkable and left ventricular ejection fraction was 60%.

The left main coronary artery was normal and the proximal LAD stent was patent. There was plaque in the circumflex artery beyond the first obtuse marginal branch. The RCA was occluded flush at the aorto-ostial level within the previous stent, and the distal vessel filled retrogradely through septal collaterals from the LAD (Figure 1). Coronary computed tomography (CT) angiography showed the proximal edge of the ostial RCA stent protruding 3 mm into the aortic lumen (Figure 2).

Bifemoral access was used with 7-Fr sheaths. Several catheters were tried before stable coaxial engagement of the RCA was obtained with an amplatz right 2; the left system was engaged with an EBU 3.5. Antegrade cap puncture was attempted with Gaia Next 2 and Gaia Next 3, then with a polymer-jacketed Gladius MG. The wire repeatedly tracked subintimally, outside the stent struts (Figure 3). We converted to a retrograde approach.

The second septal collateral was crossed with a Sion wire on a Corsair microcatheter. Just proximal to the crux, the retrograde wires again went subintimal and would not re-enter the stent lumen; a low-volume tip injection confirmed the extraluminal course.

A safety wire had been placed in the LAD at the start of the case, but it had lost its position during the long procedure. With the donor vessel unprotected, the patient developed chest pain and became hemodynamically unstable. Angiography showed a thrombosed, flow-limiting dissection immediately proximal to the LAD stent, which had terminated within the ostial plaque (Figure 4A). The CTO attempt was abandoned. The segment was rewired quickly, and balloon angioplasty restored antegrade flow and hemodynamic stability.

The retrograde procedure was then resumed. A Gaia Next 2 was advanced through the stent lumen into the antegrade guide catheter and trapped with

a balloon, the retrograde microcatheter was torqued into the guide, and an RG3 wire was externalized. The RCA was prepared with 1.2, 2.0, and 2.5 mm SC balloons, then with 3.0×30 mm and 3.5×15 mm NC balloons. At this point the system was converted to antegrade and attention returned to the left system. Intravascular ultrasound (IVUS) of the LAD showed that the stent implanted a month earlier was underexpanded. A 4.0×15 mm NC balloon was used both to expand that stent and to prepare the segment for the new one. A 4.0×23 mm everolimus-eluting stent was implanted from the left main into the LAD so that it overlapped the previous stent, and POT was performed with a 5.0×10 mm balloon (Figure 4B). IVUS of the RCA, now approached antegradely, showed stent underexpansion, neoatherosclerosis within the proximal stent, and deformation of the ostial segment. A 3.5×15 mm cutting balloon was used, followed by 3.0×48 mm and 4.0×38 mm everolimus-eluting stents implanted from the distal vessel back to the ostium, with POT using a 4.0×15 mm NC balloon. A 2.5×30 mm paclitaxel-coated balloon was then applied to the distal segment at 8 atm for 60 seconds. The case ended with a type A dissection and TIMI 3 flow (Figure 5).

Conclusion: What shaped this case was not the occlusion itself but the geometry left behind by two earlier procedures. On the right, the stent protruded far enough into the aorta to prevent coaxial engagement. On the left, the stent stopped inside ostial plaque and left an uncovered segment that was fragile to instrumentation, which is where the dissection occurred. Preprocedural coronary CT angiography is usually discussed in terms of vessel course, total occlusion length, and calcium content. In flush aorto-ostial cases it offers something further. By showing where the coronary ostium sits in relation to the aortic root, it gives some warning of how difficult engagement is likely to be.

Consensus documents are explicit about keeping a safety wire in the donor vessel and about abandoning the CTO attempt to restore donor flow if injury occurs. In this case the wire had been placed, then lost its position, and the complication occurred in that window. The lesson is narrow but worth stating: a wire placed at the start is not necessarily a wire that is there when it is needed, and its position should be reconfirmed as the case runs long. The second point concerns the occlusion itself. In-stent occlusion is not a random event. Underexpansion and neoatherosclerosis can be shown with IVUS, and a recanalization that leaves them uncorrected will recreate the mechanism that closed the stent in the first place.

Keywords: Chronic total occlusion, in-stent occlusion, ostial stent, retrograde approach, donor artery injury

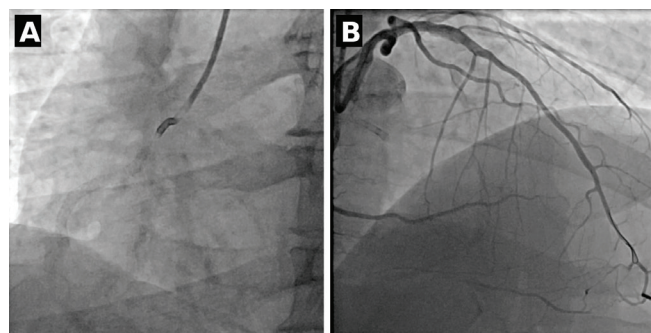


Figure 1. (A) Flush aorto-ostial in-stent total occlusion of the right coronary artery (RCA); engagement was achieved with difficulty using an AR2 guide catheter. (B) Left coronary injection showing retrograde filling of the distal RCA through septal collaterals

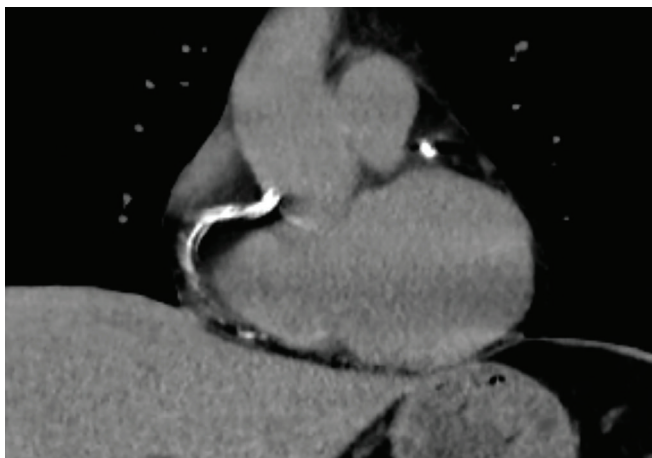


Figure 2. Coronary computed tomography angiography: the proximal edge of the ostial right coronary artery stent protrudes into the aortic lumen

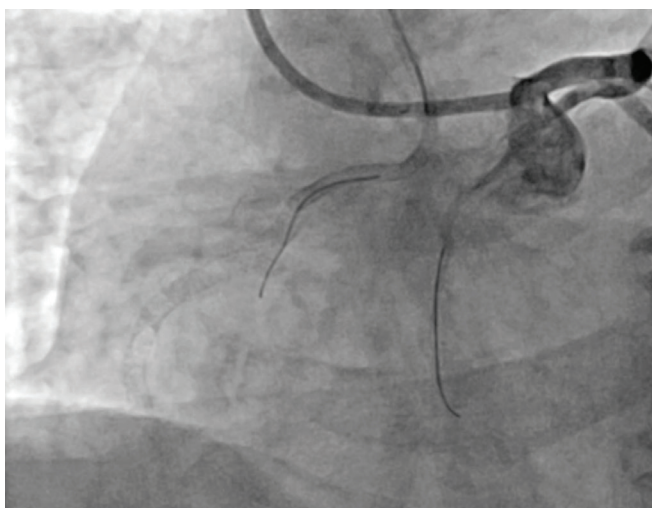


Figure 3. Antegrade attempt: ostial engagement with an amplatz right 2 guide catheter, and guidewires tracking subintimally, outside the stent struts

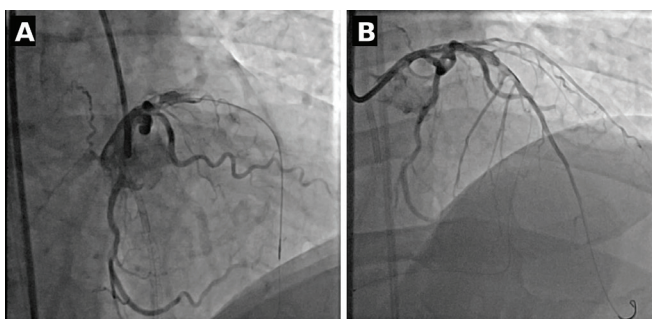


Figure 4. Donor vessel complication and bailout. (A) Angina and hemodynamic instability during the retrograde procedure; left system imaging shows a flow-limiting dissection with subtotal occlusion of the left anterior descending (LAD). (B) The thrombosed, flow-limiting dissection immediately proximal to the LAD stent, with antegrade flow restored after rapid rewiring and balloon angioplasty

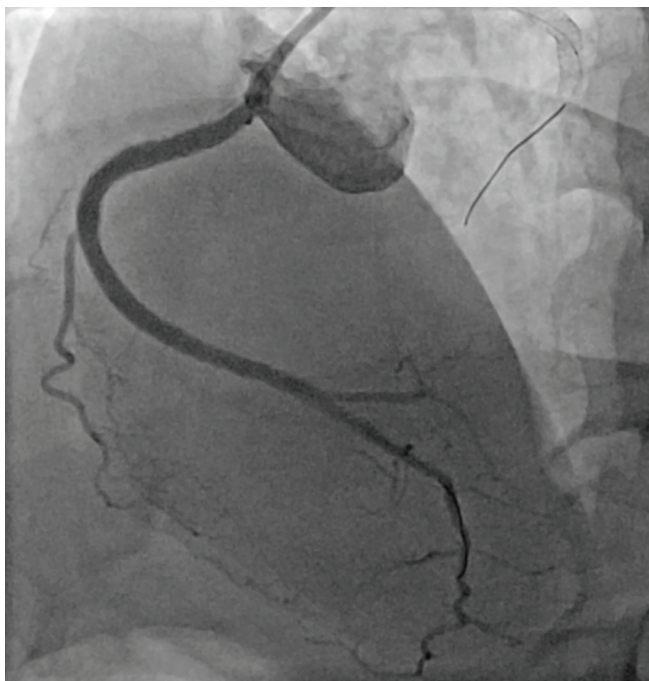


Figure 5. Final angiogram: the right coronary artery is patent from the ostium to the distal segment, with TIMI 3 flow

[OP 05]**Retrograde Approach in CTO PCI: Whom and When?**Timor Omar*Clinic of Cardiology, Kırklareli Training and Research Hospital, Kırklareli*

Aim: Percutaneous coronary intervention (PCI) for chronic total occlusion (CTO) lesions can now be performed with high success rates in experienced centers. However, it requires advanced technical and strategic approaches due to complex anatomical features. The primary approaches in CTO-PCI are antegrade and retrograde techniques. While the antegrade approach is preferred as the initial strategy for most lesions, the probability of success may decrease in cases involving an ambiguous proximal cap, a long occluded segment, inadequate visualization of the distal true lumen, or an inability to advance the guidewire in a controlled manner. In such instances, the retrograde approach serves as a significant alternative if suitable collateral anatomy exists.

In this case, an antegrade approach was initially attempted for an RCA CTO lesion; however, due to a lack of progress, the strategy was switched to a retrograde approach via LAD septal collaterals, and successful revascularization was achieved using the rendezvous technique.

Case Report: A 64-year-old male patient with a history of active smoking, hypertension, and atrial fibrillation was evaluated. PCI was planned following the detection of an RCA CTO on coronary angiography and 15% ischemia on myocardial perfusion scintigraphy.

During the procedure, an AL2 guiding catheter was positioned at the RCA ostium, and an EBU 4.0 guiding catheter was placed in the left main coronary artery. Dual coronary injection was performed to allow for a detailed assessment of the CTO anatomy. This method provided a clear evaluation of the RCA's distal bed and collateral circulation. Notably, septal collaterals extending from the LAD to the distal RCA bed were observed to provide a suitable retrograde pathway. Initially, an antegrade wire advancement strategy was attempted using a Fielder XT-R, Gia Second wires through microcatheter. However, no progress was made in crossing the CTO segment, and it was not possible to guide the wire into the distal true lumen in a controlled manner. Considering the anatomical features and the presence of a suitable septal collateral pathway, further antegrade manipulation was abandoned in favor of a retrograde strategy.

A suitable septal collateral arising from the LAD was selected, and a Sion Black wire was advanced retrogradely-supported by a Karavel 150 cm microcatheter-to reach the distal true lumen of the RCA. The retrograde wire was then passed through the CTO segment using the Gia Second, and advanced into the guiding catheter located in the RCA. Subsequently, the "rendezvous" technique was employed to advance the wire from the retrograde system into the antegrade microcatheter; the antegrade microcatheter was then coupled with the tip of the retrograde catheter and advanced into the RCA, thereby establishing stable wire support across the CTO segment.

Next, a workhorse coronary wire was placed within the RCA. Predilatation of the CTO segment was performed using a 1.5x20 mm semi-compliant balloon

followed by 2.25x25 mm and 3.0x20 mm non-compliant (NC) balloons. After adequate lesion preparation, 3.5x38 mm and 4.0x22 mm drug-eluting stents were implanted with an overlap. Post-dilatation and optimization were performed on the incompletely expanded segment using 4.5x15 mm, 4.5x25 mm, and 5.0x12 mm NC balloons. Follow-up coronary angiography demonstrated successful revascularization of the RCA, good distal flow, and an optimal stent result. No significant residual stenosis or major procedural complications were observed, and the procedure was successfully concluded.

One of the most critical strategic decisions during CTO-PCI is determining when to abandon the initially selected antegrade approach in favor of a retrograde strategy. There is no established time limit or standard number of guidewire attempts for this decision; the current approach should prioritize anatomical and technical progress over time elapsed.

The antegrade strategy may be maintained if the proximal cap is distinct, the distal true lumen is clearly visualized, and the antegrade guidewire advances in a controlled manner. Conversely, the strategy requires early re-evaluation if progress is not achieved despite repeated guidewire changes, if the guidewire consistently enters the subintimal space, or if the proximal cap is ambiguous or the distal target cannot be adequately defined via antegrade injection. Switching to a retrograde strategy-particularly when a suitable and safe retrograde collateral pathway exists alongside these findings-may be more rational than persisting with the antegrade approach for an extended period.

In this case, the visualization of a suitable septal collateral originating from the LAD during dual injection provided a significant advantage for the retrograde approach. Under appropriate anatomical conditions, septal collaterals are often preferred over epicardial collaterals because they carry a lower clinical risk of perforation. However, it is crucial to perform guidewire and microcatheter manipulations carefully and avoid unnecessarily aggressive advancement during septal collateral crossing.

The "rendezvous" technique is a valuable method that combines the advantages of both approaches by facilitating the entry of the retrograde guidewire into the antegrade system. Particularly in cases where the CTO segment can be crossed retrogradely but direct stenting or device advancement using retrograde equipment is not feasible, wire externalization provides a safe and stable working environment.

This case demonstrates that a strategy shift during CTO-PCI should be considered not only after the antegrade approach has completely failed, but also at an earlier stage-when the likelihood of success for the antegrade strategy has significantly diminished and a suitable alternative route is available. The anatomical information provided by dual injection facilitates an objective decision-making process.

Conclusion: In cases where the antegrade approach fails to progress during complex RCA CTO-PCI, a timely switch to the retrograde strategy-provided suitable collateral anatomy exists-can enhance procedural success. Dual coronary injection is critical for evaluating collateral anatomy and the distal target vessel. Retrograde crossing via the LAD septal collateral pathway and the rendezvous technique can enable successful crossing of the CTO segment and controlled revascularization in appropriate cases. Therefore, achieving a successful outcome in CTO-PCI requires not only technical skill but also the ability to recognize failure early and switch strategies at the right moment.

Keywords:

[OP 06]

This was not the Wire I Planned: Epicardial Retrograde RCA CTO PCI via 6 Fr Bilateral Radial Access after CABG

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Aim: After coronary artery bypass grafting (CABG), chronic total occlusion (CTO) percutaneous coronary intervention (PCI) more often requires retrograde crossing, and epicardial collaterals carry lower success and numerically more perforations. We describe a native right coronary artery (RCA) CTO in which an unplanned wire crossed an epicardial collateral.

Case Report:

Clinical background: A 72-year-old man with diabetes mellitus, hypertension and heart failure, with CABG 22 years earlier, presented with non-ST-elevation myocardial infarction treated with PCI of the culprit left circumflex artery (LCx). New-onset atrial fibrillation was diagnosed during the same admission and warfarin was started (CHA₂DS₂-VASC 5; HAS-BLED ≥2). Echocardiography showed a left ventricular ejection fraction of 35%, with apical akinesia and mid-anterior and mid-basal inferior hypokinesia. Hemoglobin was 13.3 g/dL and serum creatinine 1.08 mg/dL [estimated glomerular filtration rate (eGFR) 73 mL/min/1.73 m²].

Angiographic findings: Aortography showed only a patent left internal mammary artery graft. The native RCA CTO had a tapered proximal cap, calcification, bending <45°, length >20 mm and no previous attempt (J-CTO score 2, "difficult"). The distal RCA filled through an epicardial collateral arising distal to the recently stented LCx segment (Figure 1). Because the hypokinetic inferior wall suggested residual viability and revascularization was incomplete, staged RCA CTO PCI was performed 2 weeks later to restore independent antegrade flow.

Crossing strategy and equipment: Warfarin was temporarily interrupted (international normalized ratio 1.53 on the procedure day). Bilateral radial access was chosen to permit dual injection and reduce access-site bleeding; conventional 6 Fr sheaths were used because thin-walled sheaths were unavailable. A 6 Fr Amplatz Left 2 guiding catheter engaged the RCA and a 6 Fr extra-backup 3.75 guiding catheter (Launcher EBU, Medtronic) the left main coronary artery. Unfractionated heparin kept activated clotting time above 350 seconds (checked every 30 minutes). Antegrade wiring with two 3 g tip-load guidewires (Ultimate Bros 3, Asahi Intecc; Judo 3, Boston Scientific) tracked subintimally without true-lumen re-entry (Figure 2); we converted to retrograde before enlarging the subintimal space.

A 0.3 g tip-load collateral wire (SUOH 03, Asahi Intecc) was planned, but a 0.6 g workhorse wire (AnyreachP, APT Medical) crossed the epicardial collateral without force or resistance and was cautiously continued under fluoroscopic tip control. After a microcatheter (Corsair Pro XS, Asahi Intecc) crossed the collateral, the wire was exchanged for an Ultimate Bros 3. With both wires subintimal in the mid-RCA, a 2.75×15 mm balloon inflated over the antegrade wire created a common subintimal connection (reverse controlled antegrade and retrograde tracking) (Figure 3). The retrograde wire entered the proximal true lumen and antegrade guiding catheter, followed by the microcatheter. After retrograde wire removal, an antegrade floppy workhorse wire was passed through the retrograde microcatheter into the distal true lumen, and the microcatheter was withdrawn (antegrade microcatheter probing).

Complications and bail-out maneuvers: No coronary or collateral perforation occurred; the donor LCx and collateral remained intact, and no bail-out was required.

Final result: After predilatation (1.5×20 and 2.0×25 mm balloons), three stents (2.5×31, 3.0×35 and 3.5×48 mm) were implanted from distal to proximal, covering approximately 110 mm, with Thrombolysis in Myocardial Infarction grade 3 flow and 0% residual stenosis (Figure 4). Contrast volume was 350 mL (contrast volume-to-eGFR ratio 4.8), fluoroscopy time 51 min

29 s and total reference air kerma 3.21 Gy. Serum creatinine was 1.15 mg/dL at 48 hours. Aspirin, clopidogrel and warfarin were prescribed for 3 weeks from the index admission, followed by warfarin plus clopidogrel planned for 12 months. The patient was asymptomatic at 2-month follow-up.

Conclusion: After CABG, CTO PCI carries more perforations but fewer tamponades, attributed to pericardial adhesions. This protection is incomplete, because a loculated hematoma beneath adhesions can cause delayed regional tamponade. Epicardial collaterals add further risk, with lower success than septal or graft routes. The workhorse wire that crossed carried twice the tip load of the planned collateral wire; effortless passage did not prove safe intraluminal tracking, and we present it as a deviation for discussion, not a technique to adopt.

A J-CTO score of 2 predicts a lower probability of wire crossing within 30 minutes but does not by itself mandate a retrograde strategy; here, conversion followed failed antegrade true-lumen re-entry.

Antegrade microcatheter probing avoided externalization and its traction on the collateral channel and donor ostium. Triple therapy was extended to 3 weeks, within the 1-month limit for high ischemic risk, because of complex CTO PCI, approximately 110 mm of stent, diabetes and two-vessel PCI within 2 weeks; aspirin was then stopped to limit bleeding. Although direct oral anticoagulants are generally preferred, warfarin was used because the patient did not meet the Turkish reimbursement criteria for their initiation.

Keywords: Chronic total occlusion, retrograde approach, epicardial collateral, coronary artery bypass grafting, radial artery access

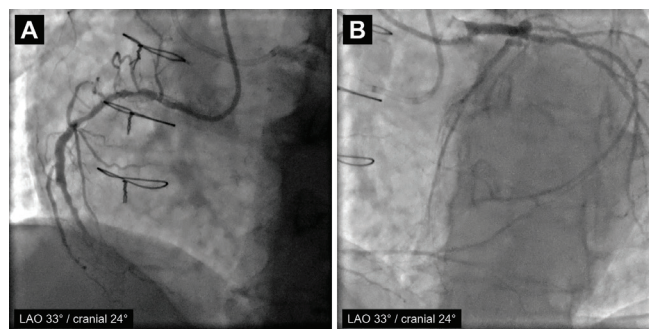


Figure 1. Baseline angiography (left anterior oblique 33°, cranial 24°). Early (A) and late (B) frames of the same acquisition, showing the native coronary anatomy and retrograde filling of the distal right coronary artery through an epicardial collateral

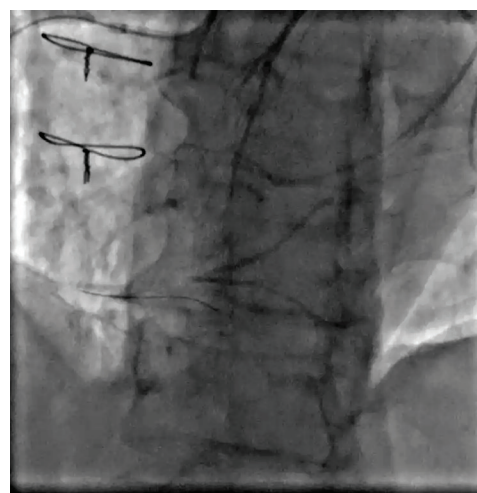


Figure 2. Antegrade attempt. Guidewires advanced under microcatheter support; the wire tracked subintimally without re-entry into the true lumen of the right coronary artery

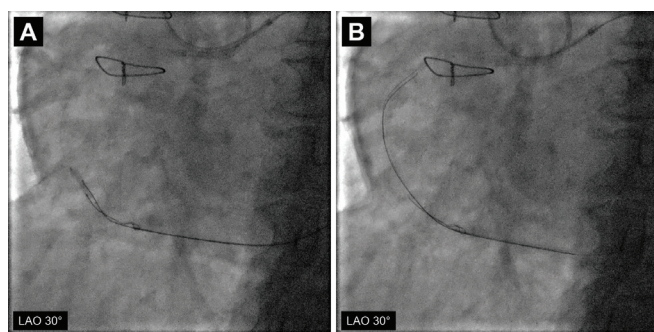


Figure 3. Retrograde crossing on fluoroscopy (left anterior oblique 30°). (A) Wire position during reverse controlled antegrade and retrograde tracking. (B) Later frame of the same acquisition showing the antegrade and retrograde equipment

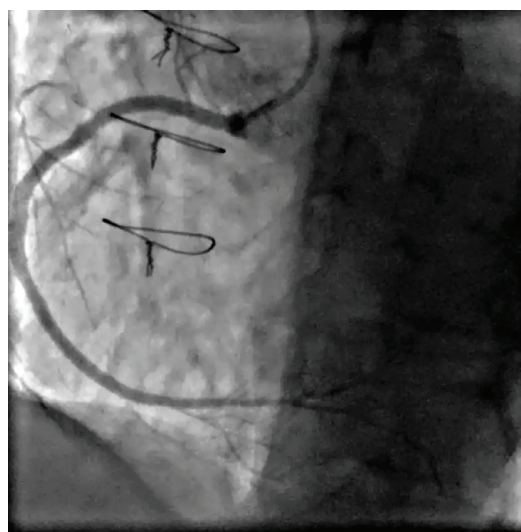


Figure 4. Final angiographic result after implantation of three stents from distal to proximal in the right coronary artery

[OP 07]

Recanalization of a Left Anterior Descending Artery Chronic Total Occlusion in a Hemodialysis Patient Using an Ipsilateral Retrograde Approach

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Case Report: A 68-year-old man was evaluated for chest pain that developed during hemodialysis. His cardiovascular risk factors included hypertension, diabetes mellitus, smoking, and a family history of coronary artery disease.

He was undergoing hemodialysis three times weekly because of chronic kidney disease. Peak troponin I level was 102.7 ng/L, and he was initially evaluated for non-ST-segment elevation myocardial infarction. Transthoracic echocardiography demonstrated left ventricular dilatation, global hypokinesia, and a left ventricular ejection fraction of 33%. Because of persistent angina, the patient was reassessed for revascularization.

Coronary angiography demonstrated chronic total occlusions of the proximal left anterior descending artery (LAD) and proximal right coronary artery, a 60-70% stenosis of the circumflex artery (Cx), and a 30-40% stenosis of the ramus intermedius. The LAD CTO had a J-CTO score of 1. Because surgical revascularization was considered high-risk, the patient's clinical status and coronary anatomy were evaluated together, and percutaneous intervention of the LAD CTO was planned.

During the first procedure, antegrade crossing was attempted using a 7-Fr EBU 3.75 guiding catheter with Finecross MG microcatheter support. Despite the use of guidewires with different characteristics, the distal true lumen could not be reached. Because the equipment required for a retrograde approach was not available at that time, the procedure was terminated and a second session was planned. The first procedure lasted 35 minutes, and no procedure-related complications occurred.

During the second session, antegrade crossing was reattempted using a Caravel microcatheter supported by Gaia, Miracle 6, and Gladius EX guidewires. Because entry into the distal true lumen could not be achieved due to the resistant distal cap and bifurcation anatomy, the strategy was changed to an ipsilateral retrograde approach through a Cx collateral channel, in accordance with contemporary CTO crossing principles.

A Sion Black guidewire and Corsair XS Pro microcatheter were advanced through the collateral channel to reach the distal CTO segment. The tip of a Gaia guidewire was reshaped, and the distal cap was successfully penetrated.

A connection space was then created within the CTO segment using 1.5×15 mm and 2.0×15 mm balloons advanced from the antegrade side as part of a reverse CART strategy. When initial attempts failed to establish an adequate connection, the balloon position and direction of the retrograde guidewire were readjusted. The retrograde guidewire was subsequently advanced into the proximal true lumen and directed into the antegrade Caravel microcatheter using the tip-in technique. The antegrade microcatheter was advanced over the retrograde guidewire, thereby converting the system to an antegrade working platform.

The lesion was predilated using 2.5×20 mm and 3.25×20 mm balloons. A 3.5×48 mm drug-eluting stent was implanted in the proximal LAD. Postdilatation and proximal optimization were subsequently performed using 3.5 mm and 4.5 mm non-compliant balloons. After the antegrade working platform had been secured, the retrograde system was carefully withdrawn, and the collateral channel was selectively assessed. The total contrast volume was 500 mL. Final angiography demonstrated no residual stenosis, and no procedure-related complications were observed.

This case demonstrates that, in a patient receiving hemodialysis with reduced left ventricular systolic function and high surgical risk, an LAD CTO that could not be crossed using an antegrade strategy could be successfully recanalized during a planned second procedure using an ipsilateral retrograde approach combined with reverse CART and tip-in techniques. Nevertheless, procedural success alone does not establish long-term clinical benefit; therefore, symptom status and subsequent clinical course should remain central to follow-up.

Keywords: Chronic total occlusion, hemodialysis, percutaneous coronary intervention, reverse CART, tip-in

[OP 08]**The Calm Before the Storm Suffering From Success**Mohamed Eltarahony*Department of Internal Medicine II, Klinikum Weiden, Kliniken Nordoberpfalz AG, Weiden, Germany*

Aim: Angiographic success during chronic total occlusion (CTO) percutaneous coronary intervention (PCI) does not exclude serious extracoronary complications. We describe retrograde right coronary artery (RCA) CTO recanalisation followed by acute brainstem ischaemic stroke and femoral access-related retroperitoneal haemorrhage, highlighting the importance of continued clinical assessment.

Case Report: A staged revascularisation strategy was adopted. First, a severely calcified, balloon-uncrossable left anterior descending artery lesion was treated with rotational atherectomy and drug-eluting stent implantation. Following clinical recovery, the patient returned for elective RCA CTO PCI. A very long calcified occlusion length with a blunt stump. J-CTO score IV.

Given the previous failed antegrade attempt, and the anticipated lesion complexity, an upfront retrograde strategy was selected. Right radial 7 Fr for donor vessel and ultrasound-guided right femoral 8 Fr access for CTO were obtained. A SUOH 03 guidewire supported by a Corsair Pro XS microcatheter enabled retrograde collateral crossing. Antegrade and Retrograde wire escalation (AWE+RWE) was followed by technically difficult reverse controlled antegrade and retrograde subintimal tracking (reverse CART), ultimately permitting guidewire externalization.

Lesion preparation comprised NC balloon dilatation then IVUS guided cutting balloon angioplasty and IVL. Two drug-eluting stents were implanted, achieving complete angiographic lesion coverage and final TIMI grade 3 flow.

The patient remained unusually calm and still during the intervention, and this behavior persisted afterwards. Despite the satisfactory angiographic result

and no initially apparent explanation for his clinical appearance, concern about his behaviour prompted urgent neurological assessment. This then down the road identified an acute brainstem ischemic stroke.

Shortly afterwards, the patient developed rapid haemodynamic deterioration with shock. Immediate investigation revealed a large retroperitoneal haematoma originating from the femoral access site. Urgent multidisciplinary management was required.

Conclusion: This case illustrates the distinction between coronary technical success and the patient's clinical outcome. Expert CTO guidance emphasises structured procedural planning and readiness to recognise and manage complications. Restoration of TIMI 3 flow should therefore be followed by continued assessment of neurological status, haemodynamics and vascular access.

The patient's unusual calmness was a nonspecific observation, not a diagnostic sign of brainstem stroke. Its importance lay in prompting reassessment despite a reassuring angiogram. The exact onset and mechanism of the cerebral event cannot be established from this clinical sequence alone.

The subsequent retroperitoneal haemorrhage highlights that ultrasound-guided femoral puncture does not eliminate access-related bleeding. Safety guidance addresses both vascular access and the evaluation of haemodynamic collapse during CTO PCI. The occurrence of shock after identification of a neurological complication also underscores the need to consider an additional cause of deterioration.

Continued clinical vigilance after successful recanalisation remains essential. The final assessment of procedural benefit must account for neurological injury, major bleeding and subsequent recovery, rather than the coronary angiogram alone.

Keywords: Re-Do CTO, chronic total occlusion, percutaneous coronary intervention, retrograde approach, complication, brainstem stroke, retroperitoneal haemorrhage

[OP 09]

Successful Revascularization of a Balloon-Uncrossable Calcific RCA CTOMertcan Gezer, Sefa Tatar, Ahmet Seyfeddin Gürbüz*Department of Cardiology, Necmettin Erbakan University Faculty of Medicine, Konya*

Aim: Balloon-uncrossable chronic total occlusions (CTOs) represent a formidable challenge in percutaneous coronary intervention (PCI). Although consensus algorithms recommend step-up support techniques, balloon rupture, and atherectomy, logistical unavailability of atherectomy can disrupt procedural momentum. In such scenarios, recanalizing an occluded donor vessel followed by retrograde wire externalization offers an effective bail-out strategy.

Case Report: A 57-year-old man with hypertension and triple-vessel coronary artery disease (LAD CTO, OM1 CTO, and heavily calcified RCA CTO) who declined surgical revascularization was admitted for staged CTO-PCI (LVEF 60%). Bilateral radial access was established with 7F sheaths. Diagnostic angiography demonstrated heavy, bilateral “tram-track” fluoroscopic calcification along the mid-to-distal RCA with a blunt proximal stump and an occlusion length exceeding 20 mm, yielding a baseline J-CTO score of 3. Dual injection confirmed faint, tortuous bridging and distal epicardial collaterals from the circumflex system. A 7F Amplatz Left 0.75 guiding catheter was engaged in the right coronary ostium, while an Extra Backup 3.5 catheter engaged the left main.

Antegrade wiring of the RCA CTO was initiated using a Fielder XT-A wire supported by a microcatheter and escalated to a Gladius EX 14, successfully penetrating the proximal cap and securing distal true-lumen position. However, Corsair Pro XS and Elongue 2.6F microcatheters failed to advance across the calcific proximal segment despite coaxial alignment. A 7F guide-extension catheter was deployed to maximize passive backup, yet it also failed to seat deep enough. Following focal plaque modification with a 2.5×15 mm cutting balloon at the entry point, the guide-extension catheter could be advanced into the proximal segment; nevertheless, small 1.0-1.5 mm semi-compliant balloons remained completely uncrossable. Intentional high-pressure balloon rupture (“grenadoplasty”) at 24 atm disrupted the entrance, favorably modifying plaque compliance and allowing an Elongue 1.7F low-profile microcatheter to cross and facilitate wire exchange for an extra-support Sion Blue ES wire. Despite deep guide-extension seating and extra-support wire anchoring, balloons still failed to traverse the lesion.

With rotational atherectomy unavailable for an estimated 3-4 hours, an initial retrograde attempt from the RCA toward the circumflex resulted in subintimal tracking and was promptly abandoned. Strategy shifted to antegrade donor-vessel recanalization: the OM1 CTO was crossed using a Caravel microcatheter and Gladius EX wire, preserving distal collateral branches, and treated with two overlapping drug-eluting stents (DES: 2.5×26 mm and 2.25×18 mm).

The recanalized OM1 conduit provided robust retrograde access to the distal RCA. An RG3 wire was tracked through the collateral network into the ascending aorta, captured using a 10-15 mm loop snare, and externalized through the antegrade guiding catheter. To mitigate catastrophic “cheese-wire” injury to the coronary artery and aortic root during high-tension maneuvers, an antegrade Elongue 2.6F microcatheter was advanced over the externalized wire as a protective sheath into the mid-RCA while the retrograde microcatheter was withdrawn.

The extraordinary pushability and rail support of the externalized wire permitted straightforward balloon crossing and sequential plaque dilatation. The RCA CTO was definitively treated with three overlapping DES (2.75×36 mm, 3.0×38 mm, and 2.5×26 mm) and optimized with high-pressure non-compliant balloon post-dilation (3.0×20 mm up to 26 atm), achieving TIMI 3 flow without dissection or perforation.

Conclusion: Balloon-uncrossable lesions occur in up to 9% of CTO interventions and remain a leading cause of technical failure, heavily correlating with severe calcification. Validated algorithmic approaches dictate escalating support, guide extensions, cutting balloons, intentional balloon rupture (grenadoplasty), and rotational or orbital atherectomy. When atherectomy faces significant logistical delays, prolonged waiting risks procedural fatigue, donor-vessel thrombosis, contrast overload, and procedural failure.

This case illustrates the utility of dynamic procedural adaptation, reflecting the core strategy-switching principles of the hybrid algorithm: recanalizing an occluded donor vessel (OM1) immediately unlocked an alternative retrograde route. Retrograde wire externalization fundamentally alters procedural physics, delivering unprecedented pushability and trackability that overcomes calcific resistance without atherectomy burrs. Subsequent high-pressure non-compliant dilation adhered to established protocols for calcific, resistant plaques.

Crucially, as emphasized in global CTO safety recommendations and early retrograde technical foundations, high-tension wire externalization creates severe straightening bias and friction. This carries a documented risk of longitudinal arterial shearing, ostial avulsion, or aortic root laceration (“cheese-wire” effect). Advancing an antegrade microcatheter over the externalized wire functions as an intravascular shield, buffering mechanical shear stress and safeguarding coronary architecture. When conventional uncrossable algorithms stall due to unavailable atherectomy, antegrade donor-vessel recanalization coupled with sheath-protected retrograde wire externalization provides a safe, highly effective bailout revascularization strategy.

Keywords: Chronic total occlusion, balloon-uncrossable lesion, donor-vessel recanalization, wire externalization, cheese-wire protection

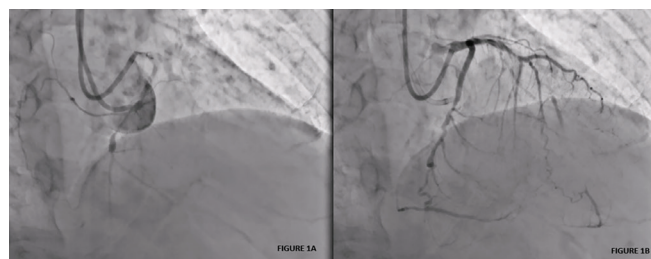


Figure 1. Baseline Dual-Injection Coronary Angiography. (A) Dual-injection diagnostic angiogram showing severe “tram-track” calcification and chronic total occlusion (CTO) of the mid-right coronary artery (RCA) with a blunt stump and collateral filling from the left coronary system (J-CTO score =3). (B) Left coronary injection demonstrating triple-vessel disease with concurrent total occlusions of the left anterior descending artery (LAD) and first obtuse marginal branch (OM1)

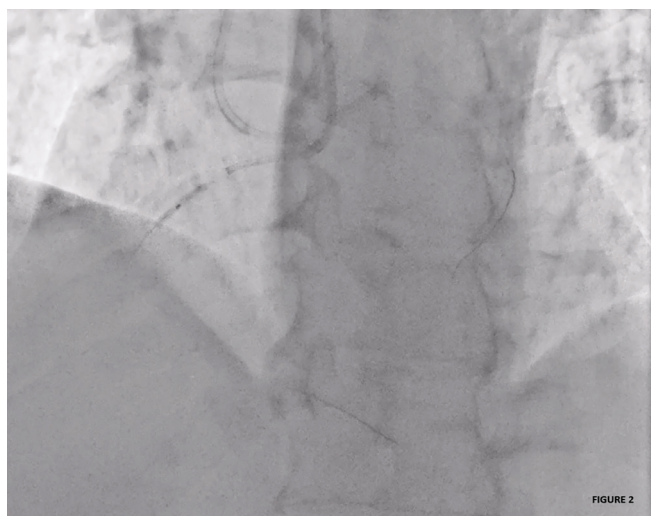


Figure 2. Proximal plaque modification. Fluoroscopy demonstrating aggressive plaque modification at the proximal calcified entry point using a 2.5×15 mm cutting balloon with guide-extension support following failure of low-profile microcatheters and semi-compliant balloons to cross the lesion

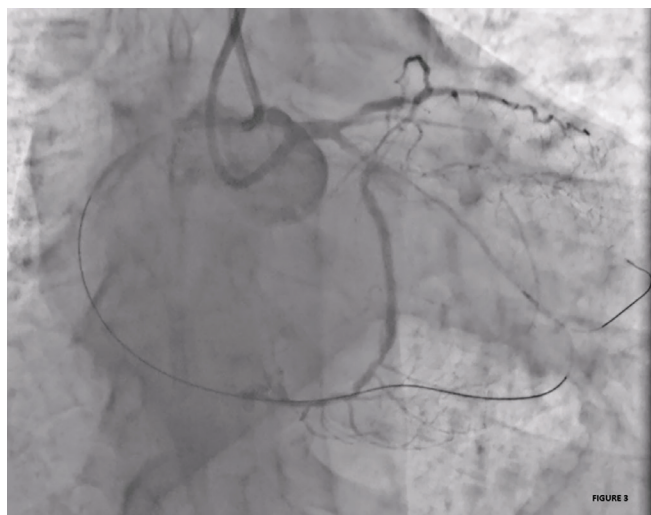


Figure 3. Initial subintimal tracking. Initial retrograde crossing attempt from the RCA toward the circumflex via epicardial channels resulting in subintimal wire tracking, which prompted immediate cessation and dynamic strategy shift toward donor-vessel recanalization

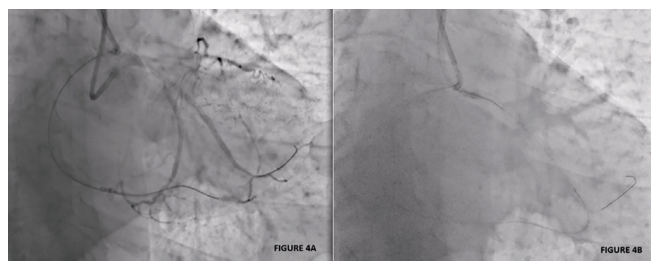


Figure 4. Donor vessel recanalization and sheath-protected wire externalization. (A) Successful antegrade recanalization and stenting of the donor OM1 branch with two overlapping drug-eluting stents (DES: 2.5×26 mm and 2.25×18 mm), preserving critical distal collateral channels to the RCA. (B) Retrograde advancement of an RG3 guidewire through the recanalized OM1 conduit into the ascending aorta, followed by loop-snare capture and externalization. An antegrade Elongate 2.6F microcatheter is simultaneously tracked over the externalized wire as a protective sheath to prevent "cheese-wire" vascular and aortic-root trauma

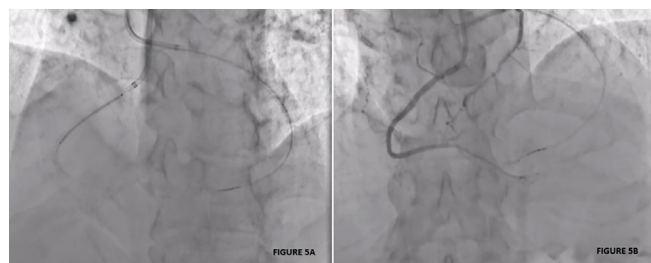


Figure 5. Flossing-assisted RCA revascularization and final result. (A) Predilation, deliverability of low-profile balloons, and deployment of three overlapping DES (2.75×36 mm, 3.0×38 mm, and 2.5×26 mm) enabled by the rigid rail support of the externalized wire. (B) Final coronary angiography showing fully restored, optimal TIMI 3 flow and 0% residual stenosis in both the RCA and donor OM1 following non-compliant balloon post-dilation at 26 atm, without evidence of dissection or perforation

[OP 10]**Opening is not Enough: Inadequate Lesion Preparation and Reocclusion in CTO PCI**Mehmet Emin Gökçe¹, Zübeyir Bulat¹, Cüneyt Koçuş²¹*Clinic of Cardiology, Şırnak State Hospital, Şırnak*²*Department of Cardiology, Biruni University Hospital, İstanbul*

Aim: Circumflex (Cx) chronic total occlusion percutaneous coronary intervention is challenging due to tortuosity and calcification. Drug-coated balloons (DCBs) reduce stent profile but increase vascular recoil risks without plaque modification. We report a Cx obtuse marginal (OM) re-CTO within six months following suboptimal lesion preparation, successfully managed with a cutting balloon.

Case Report:**Clinical Background**

A 66-year-old male with diabetes mellitus and hypertension presented with an NSTEMI in December 2025, undergoing successful left anterior descending coronary artery PCI. Transthoracic echocardiography showed a left ventricular ejection fraction of 60% and an interventricular septum thickness of 12 mm. Myocardial perfusion scintigraphy revealed inferolateral ischemia, indicating elective Cx CTO PCI.

Angiographic Findings

The native Cx CTO had a tapered proximal cap, calcification, bending <45°, length >20 mm, and no previous attempt (J-CTO score 2, Progress CTO score of 1 "difficult"). The distal Cx OM bed filled through a retrograde collateral arising from the distal right coronary artery (RCA) (Figure 1). Because the hypokinetic inferolateral wall suggested residual viability and revascularization was incomplete, staged Cx CTO PCI was performed to restore independent antegrade flow.

Crossing Strategy and Equipment (1st Intervention)

To ensure dual injection support and maximize guide catheter backup, the right radial (6Fr Glide Sheath; Terumo, Tokyo, Japan) and right femoral (7Fr Sheath; Terumo, Tokyo, Japan) arteries were selected as access sites. A 7Fr extra-backup 3.75 (Launcher EBU; Medtronic, Minneapolis, MN, USA) guiding catheter was engaged in the left main coronary artery and a 6Fr JR4 (Launcher; Medtronic, Minneapolis, MN, USA) guiding catheter in the RCA. Unfractionated heparin kept activated clotting time above 350 seconds (checked every 30 minutes).

The main body of the Cx was successfully crossed anterogradely using a Gladius MG 14 guidewire (Asahi Intecc, Aichi, Japan) supported by a Corsair Pro XS microcatheter (Asahi Intecc, Aichi, Japan). However, anterograde attempts targeting the Cx OM branch entered the subintimal space and failed to enter the true lumen despite utilizing a Sasuke dual-lumen microcatheter (Asahi Intecc, Aichi, Japan) and a Gladius EX 14 wire (Asahi Intecc, Aichi, Japan).

An early transition to a retrograde strategy was executed. The distal bed of the Cx OM was reached using a SUOH 3 microwire (0.3 g tip load; Asahi Intecc, Aichi, Japan) and a Corsair Pro XS microcatheter (Asahi Intecc, Aichi, Japan). To achieve plaque modification, the proximal true lumen was crossed with a Gladius MG 14 guidewire (Asahi Intecc, Aichi, Japan). The system was converted to an anterograde approach via the "Tip-in" technique supported by a guide extension catheter (Guidezilla; Boston Scientific, Marlborough, MA, USA) and a Caravel microcatheter (Asahi Intecc, Aichi, Japan), followed by an exchange with a floppy working guidewire.

The lesion was pre-dilated sequentially with 1.20×15 mm and 2.0×20 mm semi-compliant (SC) balloons, followed by 2.5×25 mm and 2.5×30 mm non-compliant (NC) balloons. A 2.5×34 mm DCB was then applied. The procedure was concluded without stent implantation after myocardial infarction thrombolysis (TIMI) class 3 flow was achieved. No coronary perforation, donor

artery dissection, or acute occlusion occurred during the initial procedure, and no rescue maneuvers were required. However, retrospective analysis of the final angiogram revealed an overlooked residual lesion and suboptimal lumen expansion in the distal segment of the Cx OM.

Six-month Follow-up and Second Procedure (Re-CTO)

Six months after the initial procedure, the patient re-presented with typical exertional angina pectoris. Control coronary angiography demonstrated a patent main Cx artery, whereas the Cx OM branch treated with the DCB was completely re-occluded (re-CTO). A repeat PCI was scheduled.

The right radial (Glide Sheath; Terumo, Tokyo, Japan) and right femoral 7Fr vascular access sites were engaged with 7Fr extra-backup 3.75 (Launcher EBU; Medtronic, Minneapolis, MN, USA) and 6Fr JR4 (Launcher; Medtronic, Minneapolis, MN, USA) guiding catheters. Anterograde tracking with a ULTIMATEBros 3 microwire (3.0 g tip load; Asahi Intecc, Aichi, Japan) resulted in subintimal entry; true lumen re-entry could not be established despite attempting the parallel wire technique.

An early transition back to a retrograde strategy was executed, and the distal Cx OM was accessed using a Sion wire (Asahi Intecc, Aichi, Japan) and a Corsair Pro XS microcatheter (Asahi Intecc, Aichi, Japan). The proximal lumen was crossed with a Gladius MG 14 wire (Asahi Intecc, Aichi, Japan), and the microcatheter was engaged via the rendezvous technique. A floppy working wire exchange was performed using the "Trap" technique within the guiding catheter.

To break the rigid fibrocalcific plaque architecture, aggressive plaque modification was performed using a 2.5×20 mm Revoedge cutting balloon (Lepu Medical, Beijing, China) following a 2.0×20 mm NC balloon dilatation. High-pressure post-dilatation was subsequently performed with a 2.5×30 mm NC balloon. The optimized lesion bed was treated with sequential implantation of a 2.5×30 mm Resolute Onyx DES (Medtronic, Minneapolis, MN, USA) and a 3.0×20 mm Synergy DES (Boston Scientific, Marlborough, MA, USA). Final stent optimization was carried out using a 3.0×25 mm NC balloon. The procedure was successfully concluded with TIMI class 3 flow and zero residual stenosis without any complications.

Contrast volume was 280 mL (contrast volume-to-eGFR ratio 3.8), fluoroscopy time 42 min 22 s and total reference air kerma 3.21 Gy. The patient remained completely asymptomatic at the 2-month clinical follow-up.

Conclusion: Achieving angiographic TIMI 3 flow in complex CTO PCI is not a standalone indicator for long-term vascular patency and procedural success. Retrospective analysis of the initial intervention highlights that standard SC and NC balloon pre-dilatations were insufficient to modify the rigid fibrocalcific plaque morphology of the lesion. The failure to disrupt plaque integrity triggered the vascular elastic recoil mechanism after DCB application, paving the way for re-CTO development within a short 6-month period.

In this challenging scenario, had intravascular ultrasound (IVUS) guidance been utilized during the first procedure, the plaque morphology could have been objectively characterized by analyzing acoustic shadowing and the calcium arc. Furthermore, the true reference vascular diameter could have been determined to avoid suboptimal balloon sizing, and angiographically hidden residual distal lesions could have been clearly identified. Employing mechanical plaque modification devices such as cutting or scoring balloons under IVUS guidance in complex and high-fibrocalcific coronary lesions overcomes tissue resistance and maximizes luminal gain. This strategic approach serves as an indispensable standard in modern interventional cardiology to optimize the vessel bed, thereby increasing intra-stent expansion and securing the durability of non-stent (DCB) strategies.

Keywords: Chronic total occlusion, percutaneous coronary intervention, ultrasonography, interventional, angioplasty, balloon, laser-cut, coronary stenosis, drug-coated balloons

[OP 11]

One CTO, Two Branches, Two Collateral PathwaysŞule Göktekin¹, Haşim Tüner², Cihan İlyas Sevgican³, Ömer Göktekin²¹Royal Shrewsbury Hospital, Shrewsbury, UK²Bahçelievler Memorial Hospital, Istanbul³Private Denizli Tekden Hospital, Denizli

Aim: Distal cap bifurcations may complicate chronic total occlusion (CTO) percutaneous coronary intervention, as coronary artery dissection/haematoma or subintimal course may compromise one of the branches. We describe a right coronary artery (RCA) CTO in which both distal branches were ultimately preserved through two separate septal collateral pathways.

Case Report: A 56-year-old woman with hyperlipidaemia and active smoking, receiving aspirin and levothyroxine, presented with exertional angina and dyspnea. Electrocardiography showed sinus bradycardia (55 bpm) with T-wave inversion in leads III and aVF and no pathological Q waves. Echocardiography revealed a left ventricular ejection fraction of 45% with inferior mid-basal akinesia, moderate mitral and tricuspid regurgitation, and an estimated systolic pulmonary artery pressure of 40 mmHg. Low-density lipoprotein cholesterol was 181 mg/dL and triglycerides 223 mg/dL; renal and hepatic function were normal. In the absence of inferior Q waves, the inferior myocardium was considered viable.

Angiography at the referring centre showed a non-obstructive left anterior descending (LAD) lesion and an RCA CTO filling via left-to-right collaterals. Dual injection shows that the distal RCA and the posterior descending artery (PDA)-posterolateral (PL) bifurcation beyond the distal cap (Figure 1). The occlusion had an ambiguous proximal cap at a side branch and an estimated length >20 mm, giving a J-CTO score of 2. Following the global CTO crossing algorithm, lesion length and the distal bifurcation led us to keep a retrograde option available from the outset.

Through bilateral radial access, with a 7 Fr extra-backup guide catheter for the left coronary artery and a 7 Fr Judkins right guide catheter for the RCA, antegrade wiring was attempted with microcatheter support (Finecross) and escalation through three guidewires (Gladius EX, Gaia 2, Gaia 3). Gaia 3 crossed the occlusion, but contralateral injection confirmed a subintimal course. After redirection the wire appeared intraluminal; however, a microcatheter tip injection performed for confirmation produced a subintimal haematoma (Figure 2).

We switched to a retrograde approach. A septal collateral to the distal PDA was crossed with a collateral-crossing guidewire (Anyreach 0.3) over a microcatheter (Finecross). Reverse controlled antegrade and retrograde subintimal tracking (reverse) was performed with a 3.0×18 mm balloon in the mid RCA (Figure 3). After balloon deflation, the retrograde wire entered the antegrade guide catheter and was externalised with a dedicated externalisation guidewire (RG3).

After predilatation with a 3.0×28 mm balloon, a 3.5×48 mm drug-eluting stent (DES) was implanted from the distal RCA into the PDA. This was followed by loss of the PL branch, attributed to carina or plaque shift and compression by the subintimal haematoma, and by a proximal RCA dissection (Figure 4). The proximal RCA was treated with 4.0×38 mm and 4.0×12 mm DES.

To rescue the PL branch, we looked for a proximal septal connection that was suspected but not clearly visualised. Septal surfing from the proximal LAD with a polymer-jacketed guidewire (Sion Black) over a Finecross microcatheter reached the PL branch. The retrograde wire was then advanced into an antegrade microcatheter (tip-in technique), enabling antegrade wiring of the PL branch without full externalisation (Figure 5). Kissing balloon inflation was performed with 2.0×12 mm (PL) and 3.0×15 mm (PDA) balloons.

Final angiography showed TIMI 3 flow in the RCA, PDA and PL branches without perforation. The in-hospital course was uneventful, and the patient was discharged two days later.

Conclusion: A distal cap bifurcation favours a retrograde or hybrid strategy, because antegrade subintimal course and haematoma may compromise a branch.

That haematoma followed a microcatheter tip injection performed to confirm wire position. Tip injection can extend a dissection plane, particularly when the wire is subintimal; true-lumen confirmation should rely primarily on contralateral injection in orthogonal projections, or intravascular ultrasound when available.

The PL branch was rescued through a second, angiographically inconspicuous septal pathway from the proximal LAD. Septal surfing can locate connections not visible on angiography, and the tip-in technique allowed conversion to antegrade wiring without a second externalisation. Reviewing every potential collateral route, not only the dominant one, may provide a bail-out when a side branch is lost.

Keywords: Chronic total occlusion, retrograde approach, reverse CART, septal collateral, side branch occlusion

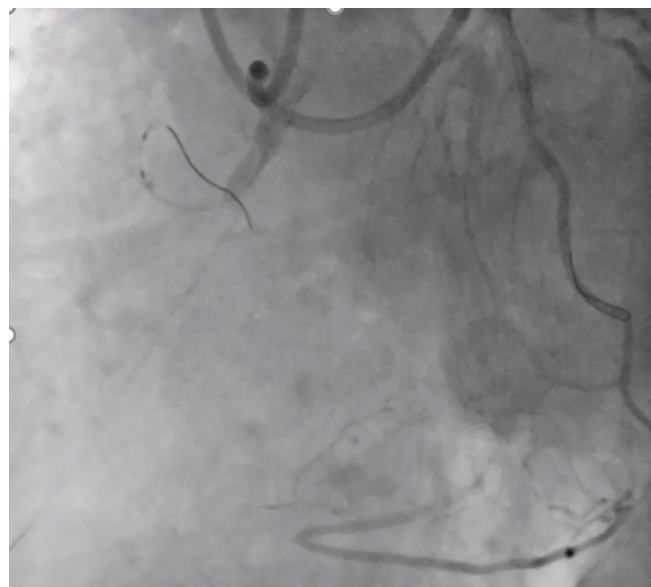


Figure 1. Dual injection showing the right coronary artery chronic total occlusion with an ambiguous proximal cap and the distal posterior descending-posterolateral bifurcation filled via septal collaterals



Figure 2. Subintimal haematoma after microcatheter tip injection



Figure 4. Loss of the posterolateral branch after distal drug-eluting stent implantation and Proximal right coronary artery dissection



Figure 3. Retrograde septal crossing to the distal posterior descending artery and reverse controlled antegrade and retrograde subintimal tracking, with the balloon deflated



Figure 5. Final result after kissing balloon inflation

[OP 12]**Antegrade Wire Escalation and DK Mini-Crush Technique for Ostial LAD Chronic Total Occlusion Involving a Distal Bifurcation: A Complex PCI Case**

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Aim: Percutaneous coronary intervention (PCI) of ostial/proximal left anterior descending artery (LAD) chronic total occlusions (CTOs) can be technically challenging because of proximal cap characteristics and complex distal anatomy. When the distal cap terminates at a bifurcation, preservation of the side branch and selection of an appropriate bifurcation strategy become additional procedural considerations. We present a case of successful revascularization of an ostial LAD CTO using an antegrade wire escalation (AWE) strategy followed by DK mini-crush stenting of the distal LAD-first diagonal branch (D1) bifurcation.

Case Report: A 56-year-old man presented with progressively worsening angina over the preceding six months. His medical history included insulin resistance, obesity (BMI: 32 kg/m²), hyperlipidemia, and previous PCI with stent implantation in the proximal LAD five years earlier. Electrocardiography demonstrated sinus rhythm, loss of R-wave amplitude in leads V1-V3, and T-wave inversion in the inferior leads. Transthoracic echocardiography revealed a left ventricular ejection fraction of 35%, with mild mitral and tricuspid regurgitation. Myocardial perfusion scintigraphy demonstrated ischemia, and coronary angiography with a view to revascularization was planned.

Coronary angiography demonstrated an approximately 20-mm CTO originating from the ostial LAD. An antegrade approach was selected. Using a TrueCross microcatheter, an AWE strategy was performed with initial advancement of a Fielder XT-A guidewire followed by escalation to a Gaia Second guidewire. The CTO segment was successfully crossed, and the distal true lumen was reached.

The distal cap terminated at the LAD-D1 bifurcation, where a vessel diameter mismatch and a bifurcation angle <60° were observed. Considering the anatomy and the need to preserve both branches, a planned two-stent strategy using the DK mini-crush technique was selected.

Stepwise lesion preparation of the LAD and D1 was performed using 2.5×15-mm non-compliant (NC) balloons. A 2.5×15-mm Xience drug-eluting stent (DES) was then implanted in D1. Following side-branch ostial modification, crushing was performed using a 3.0×15-mm NC balloon in the LAD. Subsequently, a 3.0×33-mm Xience DES was implanted in the LAD. Proximal optimization technique (POT) was performed using a 3.5×15-mm NC balloon, and the remaining optimization steps of the DK mini-crush technique were completed. The procedure resulted in a satisfactory angiographic outcome with preserved flow in both the LAD and D1.

Conclusion: Ostial LAD CTOs represent a challenging subset of complex coronary interventions, particularly when the distal cap terminates at a major bifurcation. In this case, a systematic AWE strategy with microcatheter support and guidewire escalation from Fielder XT-A to Gaia Second enabled successful crossing of the approximately 20-mm ostial LAD CTO. The distal LAD-D1 anatomy, characterized by vessel diameter mismatch and an acute bifurcation angle, required careful planning after successful CTO crossing.

A DK mini-crush strategy, incorporating adequate lesion preparation, side-branch stenting, ostial modification, crushing, main-vessel stenting, and POT, enabled successful treatment of both branches. This case highlights the importance of systematic wire escalation, appropriate device selection, careful assessment of distal bifurcation anatomy, and stepwise execution of bifurcation PCI techniques when treating complex CTO lesions involving a distal bifurcation.

Keywords: Chronic total occlusion, ostial LAD, antegrade wire escalation, DK mini-crush, bifurcation PCI, CTO-PCI, proximal optimization technique

[OP 13]**Yin-Yang Sign on IVUS: Left Main Intimal Flap During Retrograde LAD CTO PCI**

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Aim: Chronic total occlusion (CTO) percutaneous coronary intervention (PCI) of an ostial left anterior descending (LAD) lesion carries risk of left main coronary artery injury. Intravascular ultrasound (IVUS) is critical for preventing complications, because bifurcation anatomy cannot be reliably assessed by angiography alone in the setting of CTO recanalization.

Case Report: A 72-year-old woman with Canadian Cardiovascular Society class II angina was admitted for elective recanalization of an LAD CTO. Her history included hypertension, hyperlipidemia, active smoking, and peripheral artery disease (PAD). RCA PCI was performed in 2025. Echocardiography showed severely reduced left ventricular systolic function with diffuse hypokinesis and anterior akinesis. Cardiac MRI confirmed viability in the LAD territory, supporting revascularization.

Angiography demonstrated a calcified ostial LAD CTO (J-CTO score: 2) and retrograde filling via a right ventricular branch epicardial collateral. Biradial access was obtained, a 7 Fr EBU 3.5 guiding catheter engaged the left coronary artery and a 7 Fr AL 1.0 catheter the right coronary artery. The use of an 8 Fr guiding catheter for IVUS-guided proximal cap puncture was not considered feasible because of the patient's PAD. The proximal cap was punctured using a Sasuke dual-lumen microcatheter and a Gaia Next3 guidewire. The antegrade approach failed to advance through the occluded segment. A retrograde strategy was therefore adopted, a right ventricular epicardial collateral was crossed with a Caravel microcatheter and a Suoh03 guidewire. Reverse controlled antegrade and retrograde tracking (CART) was performed with Gaia Next2 guidewire and 2.5 mm balloon, followed by a tip-in maneuver using a Corsair Pro microcatheter. Corsair Pro failed to cross the occluded segment. The tip-in was repeated with a Turnpike Spiral microcatheter, which successfully crossed the lesion.

IVUS unexpectedly revealed an intimal flap extending into the left main coronary artery, producing a characteristic "yin-yang" appearance on cross-sectional imaging. Cutting-balloon (3.5 mm) angioplasty was performed to fenestrate the flap, and the left main bifurcation was subsequently treated with the double-kissing (DK) crush technique. Final angiography and IVUS confirmed an excellent result, with no residual flap and TIMI 3 flow. No further procedural complications or bail-out interventions were required.

Conclusion: This case illustrates that CTO recanalization of bifurcation lesions carries an inherent risk of side branch occlusion during reverse CART in the retrograde approach. Angiography may fail to detect a subintimal guidewire position, and provisional stenting under these circumstances can result in a fatal complication, especially in the left main coronary artery (LMCA) bifurcation. IVUS identified the "yin-yang" flap before side branch occlusion occurred, allowing planned fenestration with a cutting balloon and use of the DK crush technique to protect the left circumflex artery (LCX). Failure of one microcatheter (Corsair Pro) to cross after reverse CART did not preclude success, since a plaque modifying microcatheter (Turnpike Spiral) achieved crossing. Operators should keep a flexible microcatheter armamentarium and a low threshold for exchange when necessary. Routine IVUS interrogation after reverse CART near the LMCA should be considered standard practice in ostial LAD CTO PCI to prevent LCX occlusion.

Keywords: Chronic total occlusion, percutaneous coronary intervention, retrograde approach, intravascular ultrasound, left main coronary artery

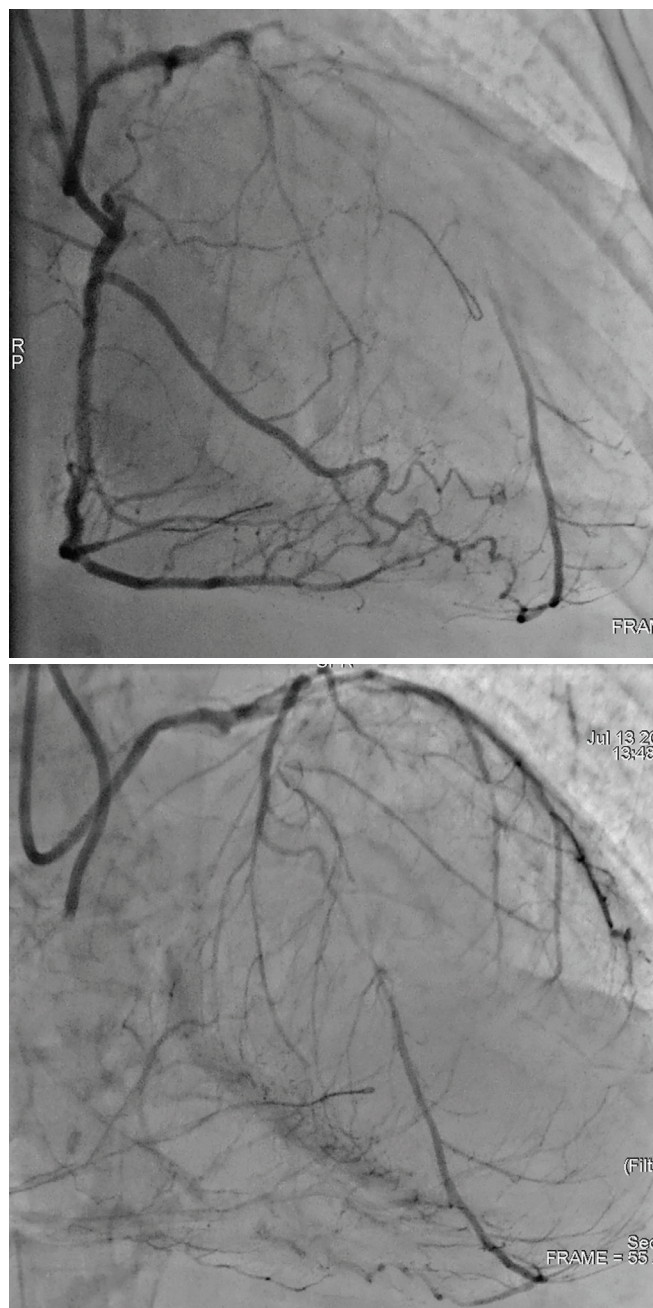


Figure 1. Baseline coronary angiography showing the ostial LAD chronic total occlusion

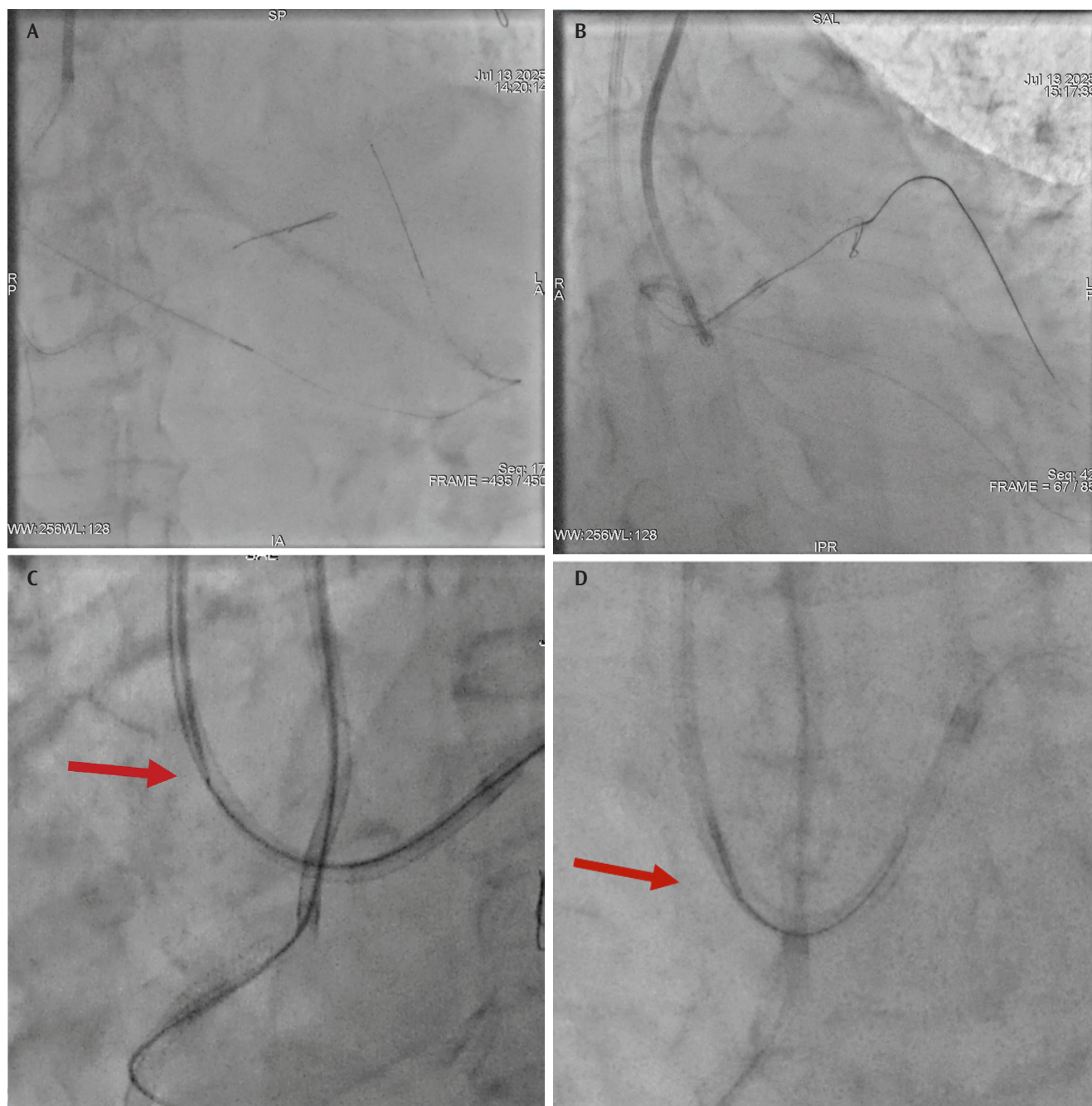


Figure 2. Retrograde approach. (A) Epicardial collateral wiring with Caravel microcatheter/Suoh03 guidewire (B) reverse CART (C) Tip-in with Corsair Pro (failed) (D) Tip-in with Turnpike Spiral (successful crossing)

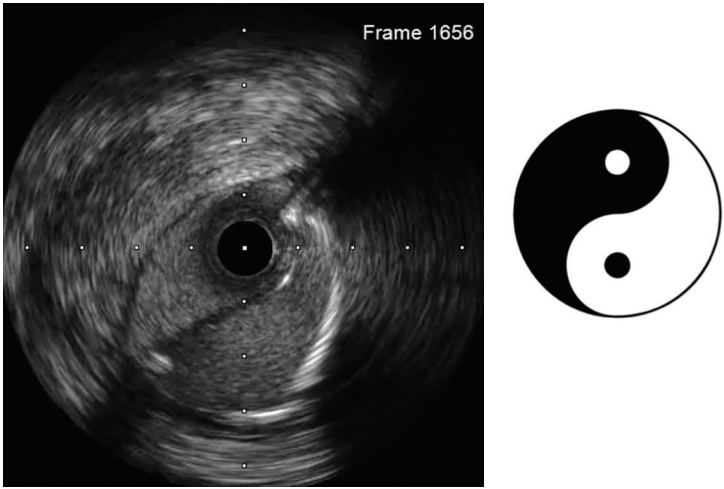


Figure 3. Intravascular ultrasound showing the intimal flap extending into the left main coronary artery, producing the “yin-yang” sign

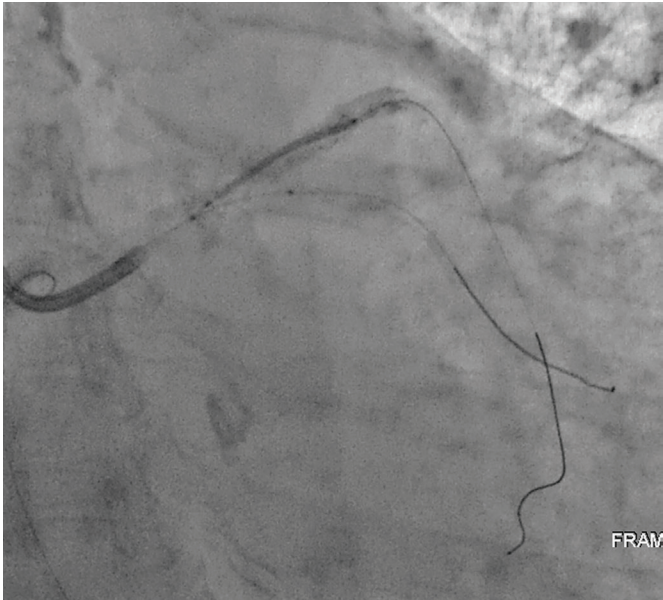


Figure 4. Double-kissing crush stenting of the left main bifurcation

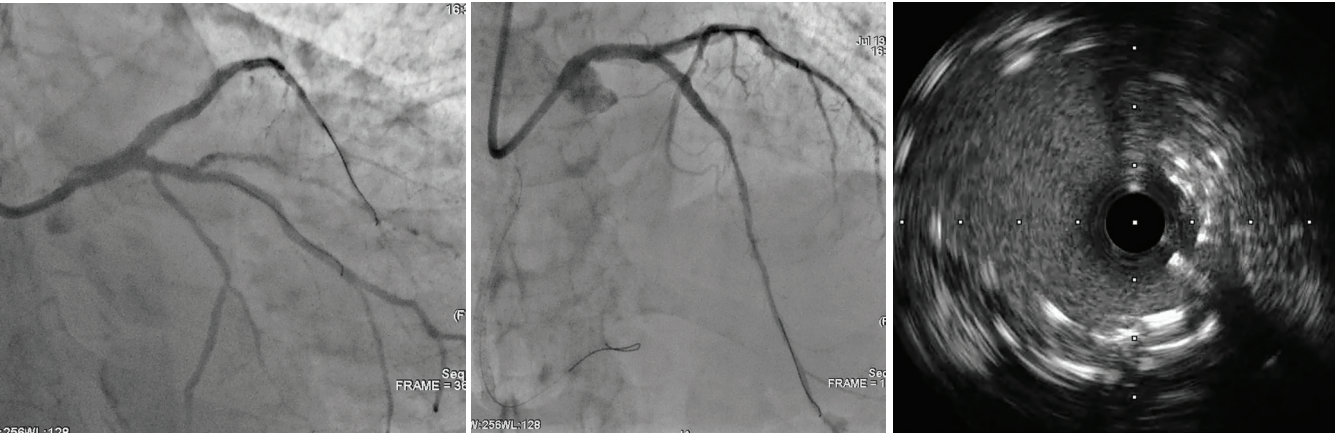


Figure 5. Final angiographic and IVUS

[OP 14]

Drug-Coated Balloon-Only Treatment After Retrograde Recanalization of a Complex RCA Chronic Total Occlusion

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Aim: Chronic total occlusion (CTO) percutaneous coronary intervention (PCI) frequently requires extensive stenting after successful recanalization. Drug-coated balloon (DCB)-only treatment may offer a stentless alternative in selected cases. We report a complex retrograde right coronary artery (RCA) CTO treated exclusively with DCBs, complicated by distal coronary perforation and delayed cardiac tamponade.

Case Report: A 61-year-old man with Canadian Cardiovascular Society class II-III exertional angina was referred to our center for revascularization of a RCA CTO identified on coronary angiography at another institution. His medical history included coronary artery disease, chronic obstructive pulmonary disease, newly diagnosed diabetes mellitus, and heavy smoking (150 pack-years). Serum creatinine was 1.5 mg/dL and HbA1c was 7.3%. Electrocardiography showed normal sinus rhythm without significant ST-T abnormalities. Transthoracic echocardiography demonstrated a left ventricular ejection fraction of 55%, without regional wall-motion abnormalities or major valvular disease.

The RCA was initially engaged with a 7-Fr AL1 guiding catheter. Because of inadequate support, this was exchanged for a 7-Fr JR4 guiding catheter. Dual injection demonstrated a long CTO with a blunt proximal cap, previous failed attempt and marked angulation, resulting in a J-CTO score of 4 (Figure 1). The left main coronary artery was engaged with an EBU 4 guiding catheter.

An antegrade crossing attempt was performed with a Corsair Pro microcatheter and sequential Gaia 2 and Pilot 200 guidewires but was unsuccessful. The Pilot 200 was advanced partially into the subintimal space and left in position.

A retrograde strategy was subsequently adopted. A large septal collateral was crossed using a Sion Black guidewire supported by a 150-cm Corsair Pro XS microcatheter. The retrograde microcatheter was advanced into the distal RCA, and tip injection confirmed an intraluminal position. Attempts at true-to-true crossing using Gaia 2, Pilot 200, and JUDO 6 guidewires were unsuccessful (Figure 2).

Reverse controlled antegrade and retrograde tracking (reverse CART) was therefore performed. The antegrade Pilot 200 was advanced subintimally, and a 2.5×10-mm balloon was inflated over the antegrade wire. The retrograde Pilot 200 subsequently entered the proximal true lumen and was advanced into the JR4 guiding catheter. After trapping the wire with a 2.5×14-mm

balloon, the retrograde microcatheter was advanced into the antegrade guiding catheter, enabling establishment of antegrade wire access (Figure 3).

Sequential predilatation was performed using 1.5×20-mm, 2.0×10-mm, and 2.5×14-mm balloons. Given the long dissection segment, negative remodeling of the distal vessel, and satisfactory coronary flow after lesion preparation, a stentless strategy was selected. A 2.5×34-mm DCB was applied proximally, followed by distal application of a 2.0×30-mm DCB with the assistance of a guide extension catheter, resulting in satisfactory angiographic patency (Figure 4).

Limited distal coronary extravasation was subsequently observed. The patient was initially hemodynamically stable, and echocardiography showed no pericardial effusion. Considering the limited extravasation and the prolonged balloon inflations already performed, the procedure was terminated and the patient was transferred for intensive monitoring.

Four hours later, tachycardia and hypotension developed. Cardiac tamponade was treated with emergency pericardiocentesis, yielding approximately 300 mL of blood. Thrombin was subsequently administered intrapericardially through the pericardiocentesis catheter, after which no further significant drainage occurred. Hemoglobin remained stable, and no clinically significant deterioration in renal function was observed.

After an uneventful subsequent clinical course, the patient was discharged. At one month, he was asymptomatic, and repeat coronary angiography demonstrated a patent RCA (Figure 5).

Conclusion: This case demonstrates the feasibility of a DCB-only strategy after complex retrograde CTO recanalization requiring reverse CART. DCB treatment avoids permanent metallic implantation and may be attractive in long lesions and negatively remodeled distal vessels, where stent sizing and late malapposition may be problematic. Contemporary registries demonstrate increasing DCB use in CTO PCI and encouraging outcomes in selected patients. The recent CTO-DENOVO registry additionally demonstrated positive remodeling in nearly half of vessels undergoing angiographic follow-up after DCB-only CTO PCI.

Coronary perforation is an important complication of CTO PCI, particularly with retrograde and dissection/re-entry techniques. Our patient initially had limited distal extravasation without pericardial effusion or hemodynamic compromise but developed tamponade four hours later, emphasizing the potential for delayed deterioration and the need for close surveillance. Emergency pericardiocentesis was followed by intrapericardial thrombin administration through the drainage catheter, after which no further significant drainage occurred. As intrapericardial thrombin is not an established standard treatment for distal coronary perforation, its use in this case should be interpreted as an individualized bailout maneuver. At one month, the patient remained asymptomatic with angiographically patent RCA.

Keywords: Chronic total occlusion, drug-coated balloon, retrograde approach, Reverse CART, coronary perforation

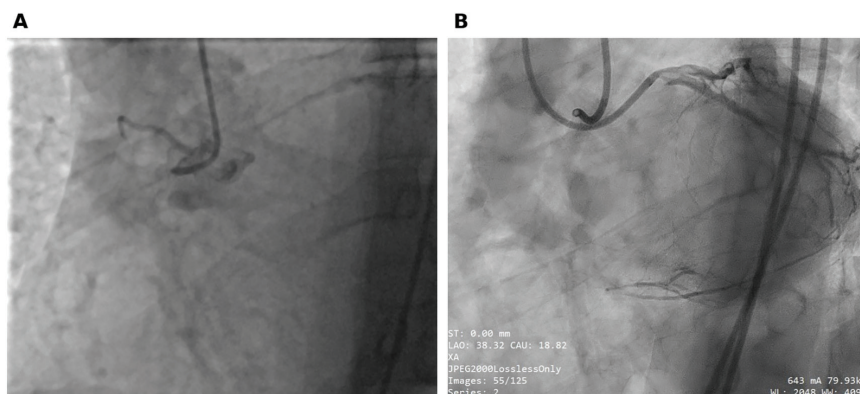


Figure 1. (A) Right coronary angiogram in the left anterior oblique projection. (B) Dual injection in the AP cranial projection. J-CTO score: 4 (blunt cap, long lesion, severe angulation, and previous failed attempt)

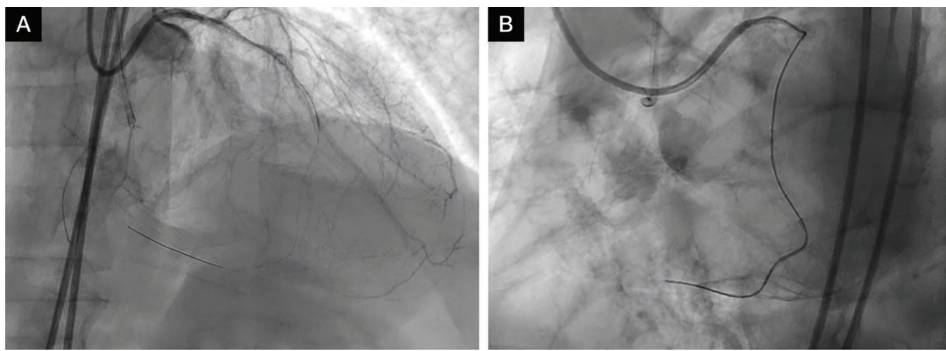


Figure 2. (A) Sion Black guidewire advanced into the posterior descending artery (PDA). (B) Corsair Pro XS microcatheter advanced over this wire into the PDA

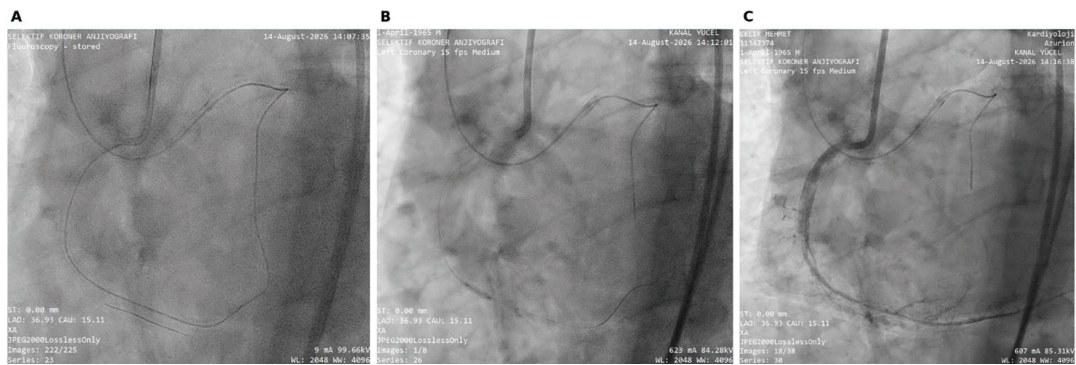


Figure 3. (A) The retrograde guidewire re-entered the proximal true lumen of the RCA using the reverse-CART technique, and the microcatheter was advanced into the JR4 guiding catheter with trapping. (B) Predilatation of the lesion with sequential coronary balloons. (C) Control angiogram showing distal coronary perforation
RCA: Right coronary artery

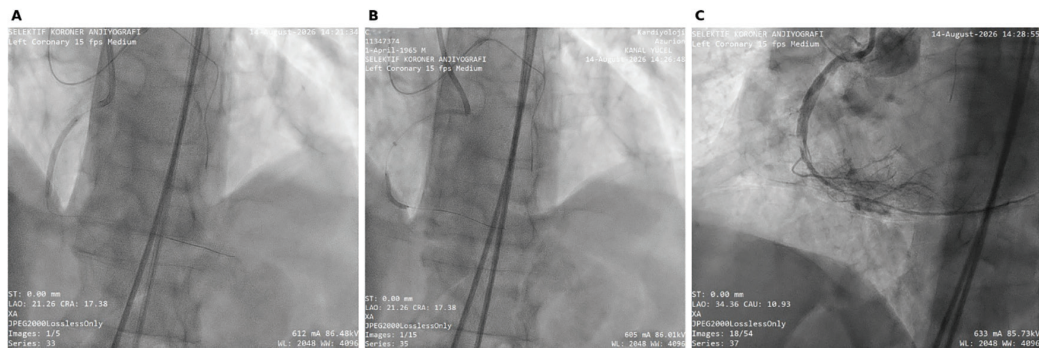


Figure 4. (A) A 2.5x34 mm drug-coated balloon (DCB) was applied. (B) A 2.0x30 mm DCB was delivered distally with the assistance of a guide extension catheter. (C) Final angiogram

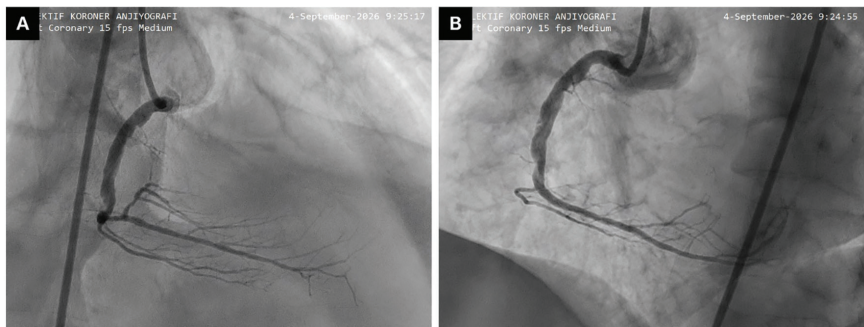


Figure 5. (A and B) control coronary angiography at 1 month

[OP 15]**A Retrograde Solution for a Flush Ostial RCA CTO: The Importance of Guide Catheter Selection**

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Case Report: A 73-year-old patient with hypertension and no previous history of coronary artery disease was admitted with Canadian Cardiovascular Society class III angina despite medical therapy. Elective coronary angiography was performed to evaluate the underlying coronary anatomy.

Coronary angiography demonstrated a normal left main coronary artery. The left anterior descending (LAD) and circumflex arteries had non-obstructive atherosclerotic plaques in their mid segments. The right coronary artery (RCA) showed a flush ostial chronic total occlusion (CTO). The distal RCA was visualized through septal collateral channels originating from the LAD.

Given the symptomatic status of the patient and the challenging flush ostial anatomy, percutaneous coronary intervention of the RCA CTO was planned using a retrograde strategy.

The retrograde approach was performed through LAD septal collaterals. A FireCross microcatheter was advanced into a suitable septal collateral channel, and collateral crossing was successfully achieved using a SUOH 03 guidewire. After successful navigation of the septal collateral, the microcatheter was advanced into the distal RCA.

A PILOT 200 guidewire was subsequently used to cross the CTO segment in a retrograde direction. After successful retrograde crossing of the occlusion, the wire was advanced toward the aortic root.

Because of the flush ostial location of the CTO, conventional engagement of the RCA ostium was not feasible. An AL2 guiding catheter was initially selected to provide stronger backup support and facilitate capture of the retrograde wire. However, despite multiple attempts, advancement of the retrograde wire into the AL2 guiding catheter was unsuccessful. Therefore, the AL2 catheter was exchanged for a JR4 guiding catheter. The different catheter configuration provided more favorable alignment with the retrograde wire, allowing successful advancement of the wire into the JR4 catheter.

Once the retrograde wire had entered the JR4 guiding catheter, a 2.5×15 mm balloon was used to trap the wire within the catheter, providing sufficient support for advancement of the retrograde microcatheter into the guide. The retrograde wire was then exchanged for an RG3 externalization wire, establishing a stable externalized rail for subsequent antegrade treatment.

Lesion preparation was performed sequentially using 2.0×15 mm and 2.5×15 mm semi-compliant balloons, followed by a 3.0×15 mm non-compliant balloon.

Drug-eluting stents were subsequently implanted from the distal RCA toward the ostium. A 3.5×28 mm DES was deployed distally, followed by a 3.5×28 mm DES in the mid RCA and a 4.0×24 mm DES in the proximal/ostial segment.

Final angiography demonstrated an excellent angiographic result with optimal stent expansion and restoration of flow throughout the RCA.

Conclusion: This case demonstrates successful recanalization of a challenging flush ostial RCA CTO using a retrograde septal approach. When initial attempts to capture the retrograde wire with an AL2 guiding catheter were unsuccessful, switching to a JR4 catheter provided more favorable alignment for wire entry. Subsequent balloon trapping, microcatheter advancement, and RG3 externalization established a stable platform for definitive antegrade treatment. The case highlights the importance of flexible guide catheter selection and wire-capture strategies when treating flush ostial RCA CTOs.

Keywords:



Figure 1. Flush ostial RCA chronic total occlusion. Selective engagement of the RCA ostium was not feasible due to the flush ostial CTO

RCA: Right coronary artery, CTO: Chronic total occlusion

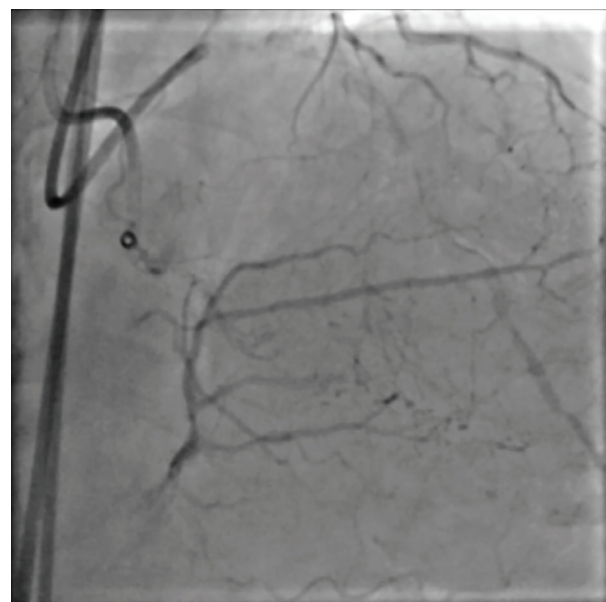


Figure 2. Distal RCA filling via LAD septal collaterals. Contralateral injection demonstrating retrograde filling of the distal RCA through septal collateral channels

RCA: Right coronary artery, LAD: Left anterior descending

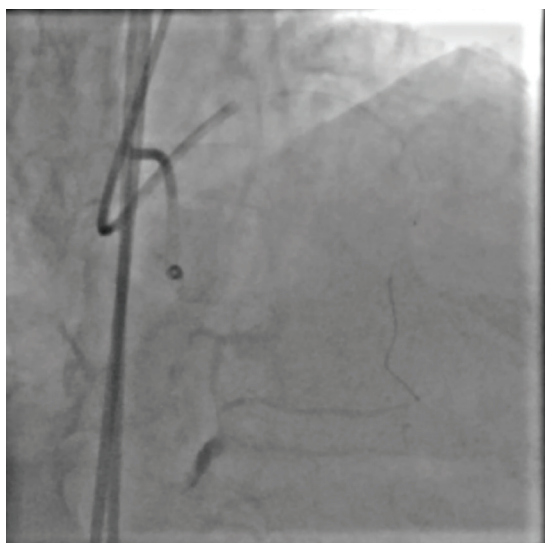


Figure 3. Retrograde septal collateral crossing. Successful navigation of the septal collateral with a SUOH 03 guidewire supported by a FireCross microcatheter



Figure 5. Final angiographic result after RCA CTO PCI. Final angiography showing successful RCA recanalization after DES implantation with restoration of antegrade flow. RCA: Right coronary artery, CTO: Chronic total occlusion

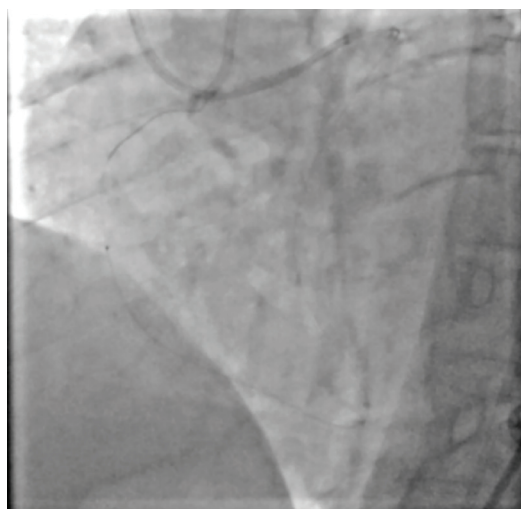


Figure 4. Retrograde crossing of the RCA CTO. Retrograde CTO crossing with a PILOT 200 guidewire after successful septal collateral passage
RCA: Right coronary artery, CTO: Chronic total occlusion

[OP 16]**Importance of Dual Injection in Chronic Total Occlusion Interventions: An RCA CTO Case Complicated by Distal Wire Perforation**

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Aim: Percutaneous coronary intervention for chronic total occlusion (CTO) requires careful planning due to its technical challenges and high risk of complications. Dual coronary injection plays a critical role in identifying the distal vessel course and confirming intraluminal wire position, particularly in CTO cases supplied by retrograde collateral flow. The absence of dual injection can lead to life-threatening complications, such as distal wire perforation. In this report, we present a case of distal wire perforation during right coronary artery (RCA) CTO intervention and its successful management.

Case Report: A 55-year-old male smoker presented to the cardiology outpatient clinic with chest pain. He had a history of percutaneous coronary intervention to the left anterior descending artery 10 years earlier. Coronary angiography was scheduled due to a positive treadmill exercise test.

Vascular access was obtained via the right radial artery using a 7-French Glidesheath Slender. Coronary angiography revealed a normal left main coronary artery, a patent LAD stent with approximately 30% stenosis proximal to the stent, and approximately 40% ostial circumflex artery stenosis. The RCA was chronically occluded from the proximal segment, with the distal vessel filling retrogradely via collaterals from the left coronary system (Figure 1). The patient's J-CTO score was 1.

Initial attempts to cross the RCA CTO segment were made using a workhorse guidewire. Despite repeated attempts and anchoring support with a 2.0×8 mm balloon, the wire could not be advanced. Subsequently, a Fielder XT-A guidewire was advanced through a Caravel microcatheter, successfully crossing

the occluded segment (Figure 2). The Fielder XT-A wire was then exchanged for a workhorse wire, and the microcatheter was removed using the Nanto technique. The lesion was then predilated with a 2.0×15 mm balloon. On repeated angiographic views, contrast extravasation due to distal wire perforation was identified in the distal PLA-PDA bifurcation region (Figure 3).

Despite intermittent balloon tamponade applied to the perforation site for a total of 20 minutes, extravasation persisted (Figure 3). Echocardiography revealed a minimal pericardial effusion. The proximal RCA segment was predilated with a 3.0×20 mm balloon, followed by the implantation of a 3.5×38 mm drug-eluting stent at the aorto-ostial position and postdilation with a 4.0×15 mm noncompliant balloon. Due to ongoing distal extravasation, embolization was performed using a 3×4 mm Helix coil, achieving complete hemostasis. A control angiogram of the left coronary system confirmed the resolution of extravasation (Figure 4).

The patient was transferred to the coronary intensive care unit. Serial echocardiographic examinations showed no increase in the pericardial effusion, and hemodynamic stability was maintained. With an uneventful clinical course and no further complications, the patient was discharged on optimal medical therapy.

Adequate visualization of the distal vessel bed in CTO interventions is crucial for procedural strategy formulation and complication prevention. In particular, when the distal vessel fills retrogradely, dual injection facilitates the verification of true intraluminal wire tracking. In this case, distal wire perforation was considered likely related to insufficient procedural confirmation of wire position. In comparable cases, dual injection serves as an essential safety step to confirm true lumen wire positioning and to enable early detection of perforation.

Conclusion: In CTO interventions with retrograde collateral supply, dual injection is vital not only for anatomical assessment but also for verifying distal wire position and optimizing procedural safety. Advancing balloons or other therapeutic equipment should be avoided until the distal target vessel and guidewire location are reliably confirmed.

Keywords: Coil, dual injection, coronary rupture, chronic total occlusion

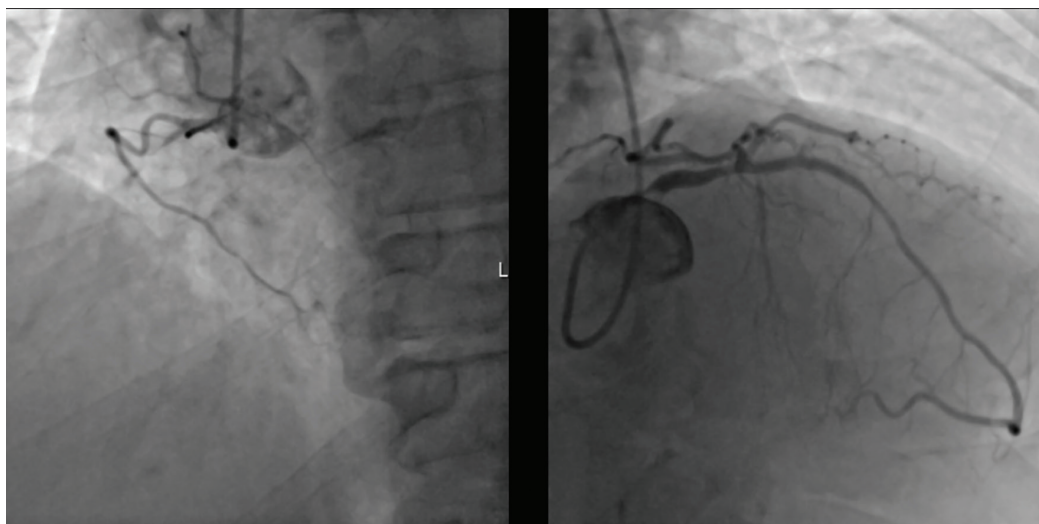


Figure 1. Coronary angiography showing complete (100%) occlusion of the proximal RCA with retrograde collateral filling from the left coronary system
RCA: Right coronary artery

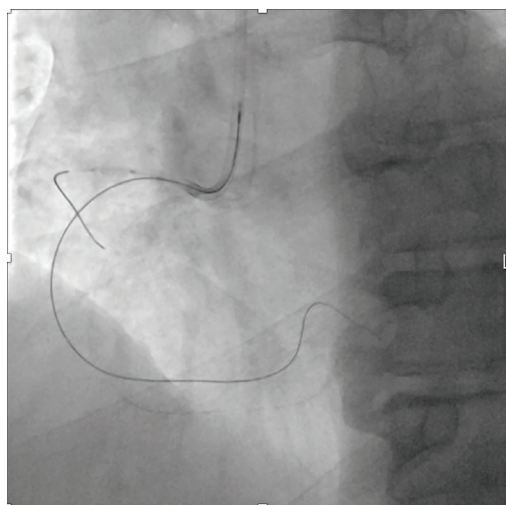


Figure 2. Successful lesion crossing achieved with side-branch anchoring and microcatheter support

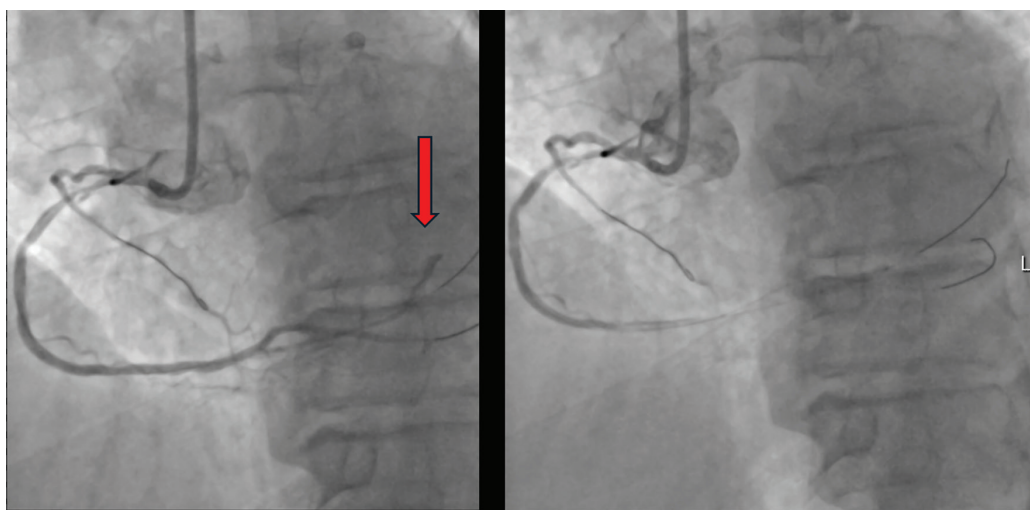


Figure 3. Distal perforation (red arrow) followed by intermittent balloon tamponade for 20 minutes

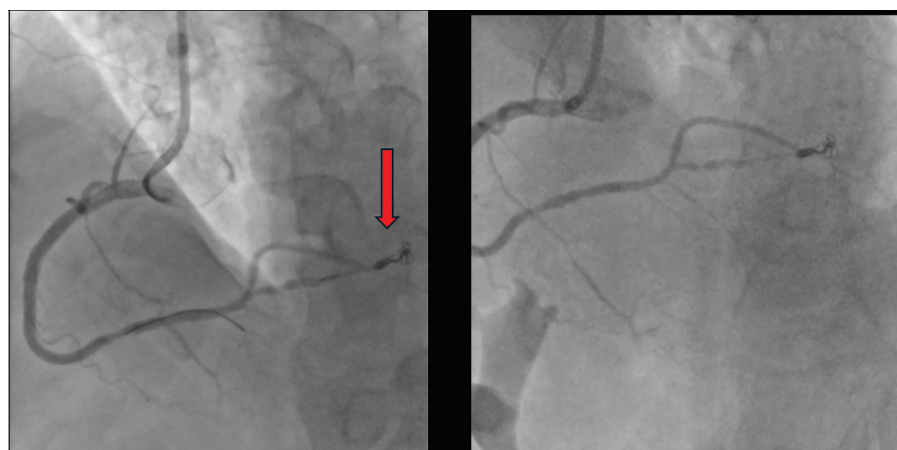


Figure 4. Coil embolization at the perforation site via microcatheter support (red arrow) and the final angiographic view showing no residual extravasation

[OP 17]

The Last Option Impella-Supported CTO PCI in Advanced Ischaemic Cardiomyopathy

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Aim: The prevalence of chronic total occlusions (CTO) is reported to be up to 31% in patients presenting with angina and index coronary angiography. The complexity of CTO percutaneous coronary interventions (PCI) has increased over time, with an increase in procedural success. A significant reason for improved success rates despite increasing CTO complexity is improvements in equipment design as well as increased operator experience over time.

Case Report: A 62-year-old man presented with a non-ST elevation myocardial infarction (NSTEMI). High-sensitivity troponin T was elevated at 196 ng/L, and electrocardiography demonstrated inferior ST-segment depression. Transthoracic echocardiography showed severe left ventricular systolic dysfunction with an ejection fraction of 20%. His medical history included previous PCI to the left anterior descending artery (LAD) and left circumflex artery (LCx) 11 years earlier for stable angina, as well as type 2 diabetes mellitus and schizophrenia. Coronary angiography demonstrated an occluded left main stem (LMS). The right coronary artery (RCA) was the only patent major vessel but was diffusely diseased and supplied extensive collaterals to the LAD and LCx territories (Figure 1). Following Heart Team discussion, coronary artery bypass grafting was considered prohibitively high risk because of severe ventricular dysfunction and concerns regarding recovery in view of his mental health condition. A strategy of CTO PCI via the RCA to the LAD/LCx/LMS was therefore adopted.

The initial procedure was performed via a bi-radial approach using a 6 Fr AR1 guide catheter to the RCA and a 7 Fr EBU4 guide catheter to the LMS. During engagement, guide-induced dissection of the RCA ostium occurred, resulting in haemodynamic instability requiring repeated metaraminol boluses. The RCA was immediately treated with overlapping 3.5×28 mm and 4.0×12 mm Xience drug-eluting stents, restoring vessel integrity and flow. Given the clinical instability, further CTO intervention was abandoned.

Following repeat discussion, a second attempt was undertaken with Impella support. A 14 Fr right femoral sheath was used for Impella insertion, with right radial access for the CTO intervention. The RCA was further optimised with additional stenting and post-dilatation using a 4.0 mm non-compliant

balloon. A retrograde strategy was then pursued. The posterior descending artery was wired and septal channels were explored; however, no suitable septal connection could be identified. An epicardial collateral was successfully crossed using a Sion Black wire and Caravel microcatheter, allowing access to the circumflex territory (Figure 2). The Caravel was exchanged for a Turnpike LP microcatheter, which advanced to the proximal LCx. A Confianza Pro 12 wire was used to puncture the distal cap, which entered the antegrade guide catheter.

A tip-in manoeuvre was unsuccessful because the retrograde microcatheter could not cross the CTO body within the LMS. Antegrade wiring with a Gladius EX wire was therefore performed through the channel created by the retrograde equipment. A 0.9 mm excimer laser atherectomy catheter was advanced over the antegrade wire to modify the proximal CTO cap (Figure 3A). This facilitated retrograde microcatheter passage into the antegrade guide catheter, allowing externalisation of an RG3 wire.

The LCx was sequentially predilated with 1.2, 2.5 and 3.5 mm non-compliant balloons before implantation of a 3.5×28 mm Xience drug-eluting stent from the ostial LMS into the proximal LCx (Figure 3B and C). Given the length of the procedure and concern regarding haemodynamic reserve despite Impella support, intervention to the LAD was deferred pending optimisation of heart failure therapy. The Impella device was weaned and removed successfully, with haemostasis achieved using two 8 Fr Angio-Seal devices. The patient was discharged two days later without complications and remains clinically well.

Conclusion: This case demonstrates several important learning points. Firstly, it re-enforces the message that although guidelines remain invaluable at providing a general consensus statement regarding broad practice, they should not replace personalised patient management strategies. The BCIS-CHIP trial did not assess patients with haemodynamic instability or those in very high-risk groups such as those with single remaining vessel and severe left ventricular systolic impairment. In addition, the BCIS-CHIP haemodynamic substudy demonstrated significant loss of pulse pressure in patient undergoing more multivessel PCI, which was more frequent in the Impella arm. Indeed, we noticed a significant period of loss of pulse pressure upon revascularizing the LCx territory. This subsided by the end of the procedure however it is unlikely that a second hit from revascularizing the LAD would have been tolerated. Finally, the value of using every tool at the CTO operator's disposal is crucial to achieving success in incredibly complex cases. In this case the use of laser atherectomy on the antegrade guide wire to modify the cap to allow passage was critical to allowing passage of the retrograde microcatheter. A dynamic approach to complex CTO PCI procedures is key to enabling an efficient workflow at acceptable risk.

Keywords: Chronic total occlusion, percutaneous coronary intervention, laser atherectomy, impella

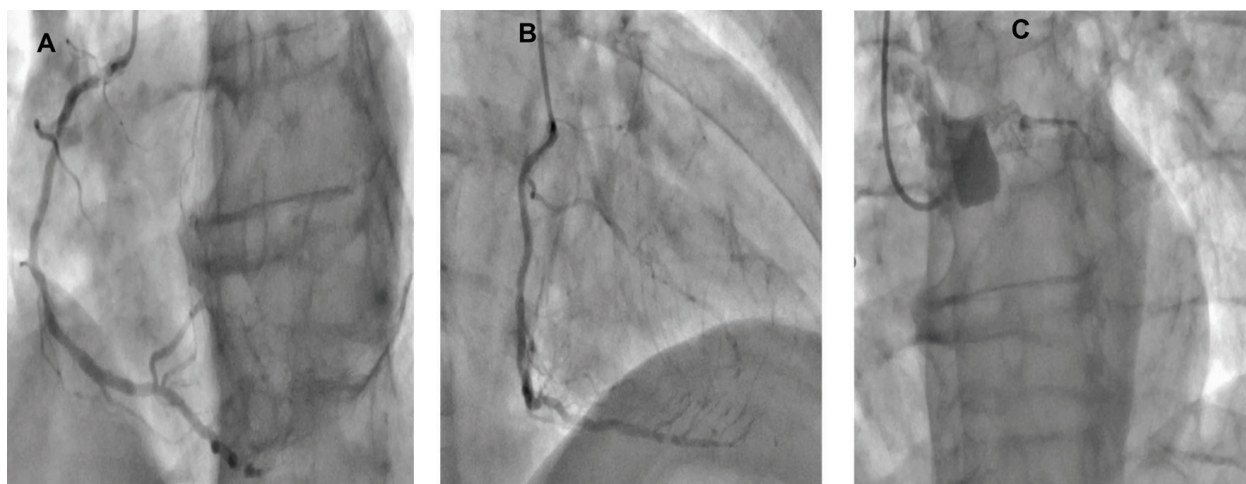


Figure 1. Initial angiographic images. (A) Severe ostial RCA stenosis, (B) collaterals to LAD and LCx territory and (C) Showing LMS stump

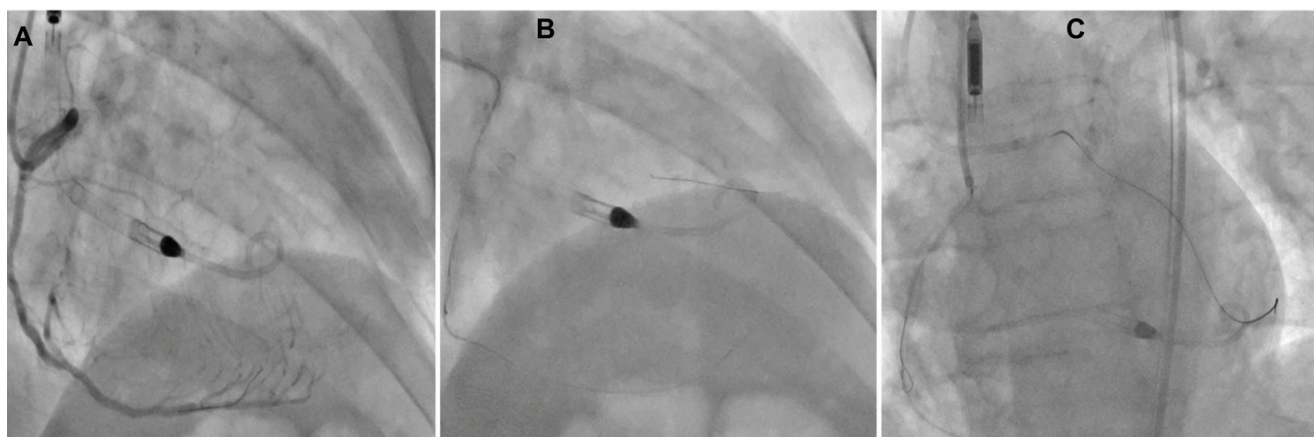


Figure 2. (A) Shows initial set-up with Impella in left ventricle, (B) depicts retrograde crossing into circumflex artery and (C) shows retrograde microcatheter in distal CTO body

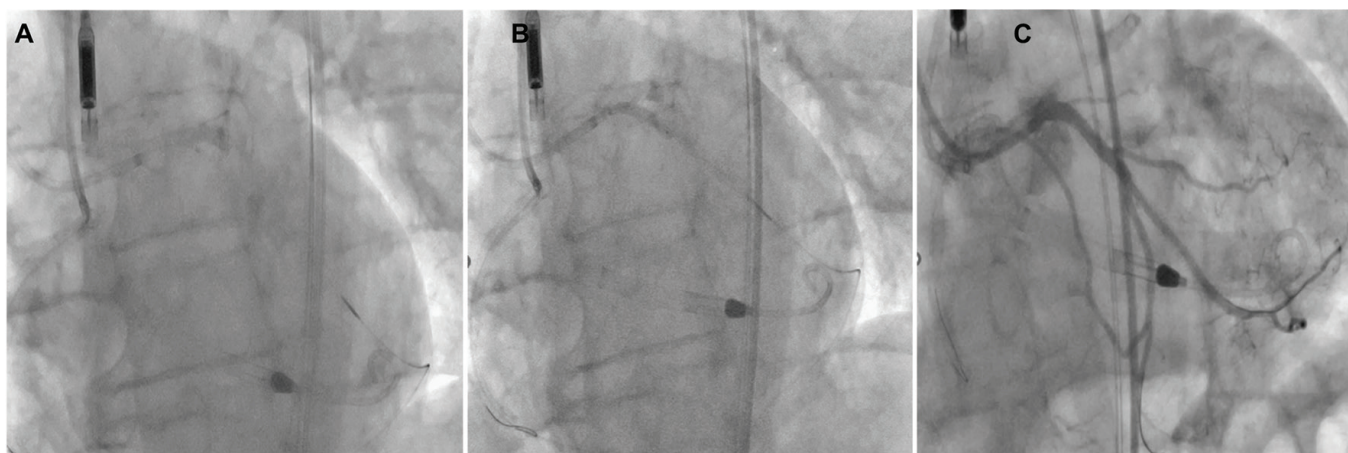


Figure 3. (A) Demonstrates antegrade laser atherectomy (B) stenting of proximal circumflex, (C) depicts final result after stenting

[OP 18]

ROCK, ROTA and RESCUE

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60-year-old gentleman with background of Type II DM, Hypertension. On regular HD. Admitted with chest pain with raised Troponin I and diagnosed with NSTEMI. Coronary Angiogram showed Severe triple vessel disease with 2CTOs. ECHO-LVEF 20%. Surgical turn-down for CABG given co-morbidities (including Sarcoidosis). Cardiac MRI undertaken which showed 3-3.5 segments non-viable, rest of LV is viable. The degree of LV dysfunction is disproportionate

to the extent of infarction, raising possibility of global ischaemic hibernation. CT aorta and peripherals showed left common femoral was 7 mm.

proceeded to high-risk double CTO with Impella support. LAD CTO was tackled using single access through impella sheath. HDR undertaken and gladius wire crossed into distal true lumen. IVUS guided PCI with two DES. 2nd access was gained RCA was now cross filling from LAD. Proximal RCA CTO was again attempted with HDR and crossed with gladius. unable to pass micro-balloon despite guide extension support. Micro catheter delivered distally and rotational atherectomy performed with 1.5 burr. Overlapping 3 DES deployed and optimised with IVUS. Left femoral closed with 2 proglide sutures.

This case demonstrates first case of double HDR for treatment of LAD and RCA CTO in a patient with severe LV impairment using impella support.

Keywords:

[OP 19]**Successful Management of Microcatheter Trapping and Subsequent Cardiac Arrest During Retrograde RCA CTO Intervention: A Case Report**

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Aim: Chronic total occlusion (CTO) percutaneous coronary interventions (PCI) are performed with high success rates thanks to advancements in modern material technology and technical approaches. However, guidewires and microcatheters used during retrograde interventions can become locked (stuck/trapped) within the lesion in the presence of heavy calcification and pronounced vessel tortuosity. Microcatheter trapping can lead to fatal complications such as coronary vessel avulsion, catheter rupture, coronary perforation, and hemodynamic collapse or cardiac arrest secondary to acute myocardial ischemia. In this case report, the approach to microcatheter trapping and the accompanying cardiac arrest developing during a retrograde RCA CTO intervention, along with the mechanical principles and clinical success of the “shaft transection” technique, are discussed.

Case Report:**Clinical History and Baseline Characteristics**

A 72-year-old female patient with a history of diabetes mellitus and hypertension presented with Canadian Cardiovascular Society Class III angina pectoris symptoms. Her medical history included coronary artery bypass grafting (CABGX3: LIMA-LAD, Ao-Saphenous-OMI-II, Ao-Saphenous-PDA) performed in 2005. Echocardiographic examination revealed a left ventricular ejection fraction of 60% (preserved), with minimal mitral and tricuspid regurgitation. Her medical therapy included acetylsalicylic acid (100 mg), clopidogrel (75 mg), atorvastatin (40 mg), fenofibrate (267 mg), metoprolol (50 mg), and oral antidiabetic agents.

Coronary angiography performed on February 20, 2026, demonstrated that the LIMA-LAD graft was patent, while the Ao-Saphenous-PDA and Ao-Saphenous-OMI grafts were totally occluded (stump) proximally. Myocardial perfusion scintigraphy revealed an 18% ischemia in the inferior wall in this patient who had previously undergone PCI to the left main coronary artery-left circumflex artery; therefore, a native RCA CTO PCI procedure was planned to reduce symptoms and ischemic burden.

Procedural Strategy and Equipment Selection

The intervention was performed via a dual femoral approach. For the antegrade approach, a 7F AL2 (Amplatz left 2) guiding catheter, Corsair XS microcatheter, and Conquest Pro 12 and Gladius EX 14 guidewires were prepared. Following the failure of the antegrade approach, the procedure was converted to a retrograde approach. For the retrograde approach, a 7F EBU 3.5 guiding catheter, 4F Finecross microcatheter, and Sion Black guidewire were preferred. Following successful passage through the septal collateral channel during the course of the procedure, retrograde advancement was achieved with the Gladius EX 14 guidewire. The tip-in technique and externalization steps with the antegrade Corsair XS microcatheter were initiated.

Complication Development: Microcatheter Trapping and Cardiac Arrest

The antegradely directed Corsair XS microcatheter became completely locked (stuck) within the calcified and markedly tortuous CTO segment. The microcatheter could be moved neither proximally nor distally; it showed

no response to manual torque and axial traction forces. As a result of the microcatheter trapping and the complete cessation of coronary flow, the patient developed cardiac arrest secondary to acute deep ischemia. A resuscitation protocol was immediately initiated, and simultaneous bailout steps were implemented for hemodynamic stabilization.

Rescue Maneuver: Shaft Transection Technique and Recovery

Considering that forcibly pulling the trapped Corsair XS microcatheter would lead to vessel rupture or avulsion, it was decided to apply “Shaft Transection”. The external portion of the microcatheter shaft was cut using surgical scissors. Following the transection, the torsional load and residual axial tension accumulated in the catheter body were instantaneously released. With the widening of the catheter inner lumen, the guidewire was freed. The system was successfully removed over the freed pathway. Subsequently, the procedure was continued using the (heavily dilated resuscitated/high-density retrograde) technique with the assistance of a 4F Finecross microcatheter. Antegrade and retrograde lumen continuity was established, and stenotic segments were successfully stented. Fully stented patency and TIMI III flow were achieved. Return of spontaneous circulation was established, the cardiac arrest status resolved, and the patient was admitted to the intensive care unit for follow-up in a hemodynamically stable condition.

Hybrid-braided microcatheters used in complex CTO PCI procedures (e.g., Corsair, Corsair XS) are manufactured using braided stainless steel wire technology to provide high torque transmission and penetration power. However, in heavy calcification or angulated lesions, this microstructure can predispose to a special mechanical trapping.

Mechanical Physics of Microcatheter Trapping

1. “Chinese Finger Trap” Effect: When a microcatheter is trapped in a narrow or calcified channel, the pulling force applied proximally by the operator causes the catheter to elongate longitudinally. As the braided steel structure elongates longitudinally, the inner lumen diameter of the catheter narrows. This narrowing of the inner lumen compresses the guidewire inside like a vise, immobilizing it.

2. Lost Tension and Accumulated Load (Residual Tension): At the moment of trapping, high axial tension and torque (torsional load) accumulate along the catheter shaft. As the operator continues to pull from the proximal end, this tension increases and exacerbates the mechanical lock.

3. Resolution Mechanism of Shaft Transection: When the microcatheter body is cut from the outside (shaft transection), the axial tension and torsional load accumulated in the braided steel wires are instantaneously released. With the elimination of the pulling force, longitudinal elongation ceases, the inner lumen of the catheter expands to its original diameter, and the compressive force on the guidewire is removed.

Conclusion:

1. Microcatheter Trapping Risk Management: When a microcatheter becomes locked (stuck) during retrograde or antegrade CTO PCI, forcing the system by applying excessive power can lead to catheter rupture, coronary vessel avulsion, or ischemia-induced arrest.

2. Shaft Transection as a Mechanical Solution: Cutting the microcatheter from its shaft (shaft transection) is an extremely rapid, safe, and effective bailout method that dampens the accumulated axial tension (residual tension) and the “Chinese Finger Trap” effect in the hybrid braid structure, allowing the guidewire to be freed.

3. Crisis Management and Success: In dramatic conditions such as cardiac arrest developing secondary to trapping, calm mechanical intervention and simultaneous resuscitation are of vital importance for procedural success and patient survival.

Keywords:

[OP 20]**When Angiography Says Open: IVUS Reveals a False Lumen During RCA CTO PCI**

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Case Report: A 50-year-old man with no significant comorbidities was referred for elective percutaneous coronary intervention (PCI) of a chronic total occlusion (CTO) of the right coronary artery (RCA). One month earlier, coronary artery bypass grafting had been recommended at another centre; however, the patient declined surgery. Subsequently, PCI of the left anterior descending (LAD) and circumflex (LCx) arteries was performed at our centre, and staged PCI of the RCA CTO was planned. The ECG showed normal sinus rhythm. Left ventricular ejection fraction was 60%, and the SYNTAX score was 23.5. His medical treatment included acetylsalicylic acid, clopidogrel, nebivolol, atorvastatin, isosorbide mononitrate, and colchicine.

Right radial and right femoral access sites were used. An Amplatz left (AL) guiding catheter was engaged in the RCA for support, while an EBU guiding catheter was engaged in the left main coronary artery. Dual coronary injection was performed to assess the CTO anatomy and distal target vessel. Following engagement of the AL guiding catheter, a dissection developed in the RCA. Angiographically, we thought that the dissected segment might have reconnected with the distal true lumen. After advancement of a floppy guidewire, intravascular ultrasound (IVUS) was performed before stent implantation. IVUS demonstrated an extensive dissection extending along the RCA, with the antegrade wire located in the false lumen and compression of the adjacent true lumen.

Therefore, the procedural strategy was changed to a retrograde approach. Septal collateral crossing was performed using a Finecross MG microcatheter

and Sion guidewire. IVUS confirmed that the retrograde wire was positioned within the true lumen, whereas the antegrade wire remained in the false lumen. A tip-in technique was then performed, allowing the retrograde wire to enter the antegrade microcatheter. An attempt was subsequently made to advance a Corsair Pro XS microcatheter antegradely; however, the microcatheter could not be advanced. Therefore, RG3 wire externalization was performed. IVUS was repeated and confirmed the wire position within the true lumen. After successful confirmation of true-lumen position, the lesion was predilated with 1.5×15 mm and 3.0×30 mm balloons. A 3.5×30 mm drug-eluting stent was implanted proximally and a 3.0×30 mm drug-eluting stent distally, followed by post-dilatation with a 3.5×15 mm non-compliant balloon. Final angiography demonstrated successful restoration of RCA flow.

In this case, IVUS changed our procedural strategy at a critical stage. Instead of proceeding with stent implantation based on an apparently successful but actually false-lumen wire position, we used IVUS to clarify the intravascular anatomy. Based on the IVUS findings, we switched to a retrograde approach and confirmed true-lumen wire position before stent implantation.

One of the important lessons from this case was the importance of balancing guide-catheter support and vessel safety. An AL guide catheter can provide strong support during complex RCA CTO PCI; however, deep engagement, aggressive manipulation, or forceful contrast injection may increase the risk of catheter-induced coronary dissection. Therefore, maintaining coaxial alignment, monitoring pressure, and using strong guide support carefully and in a controlled manner are essential. Another important point is that successful guidewire passage through an occluded segment does not necessarily mean that the wire is positioned within the true lumen. IVUS can provide critical information about guidewire position, distinguish the true lumen from the false lumen, and help determine the subsequent CTO strategy. It can also be used during retrograde procedures to assess wire position and guide complex crossing strategies.

Keywords: Chronic total occlusion, intravascular ultrasound, false lumen, true lumen, retrograde PCI

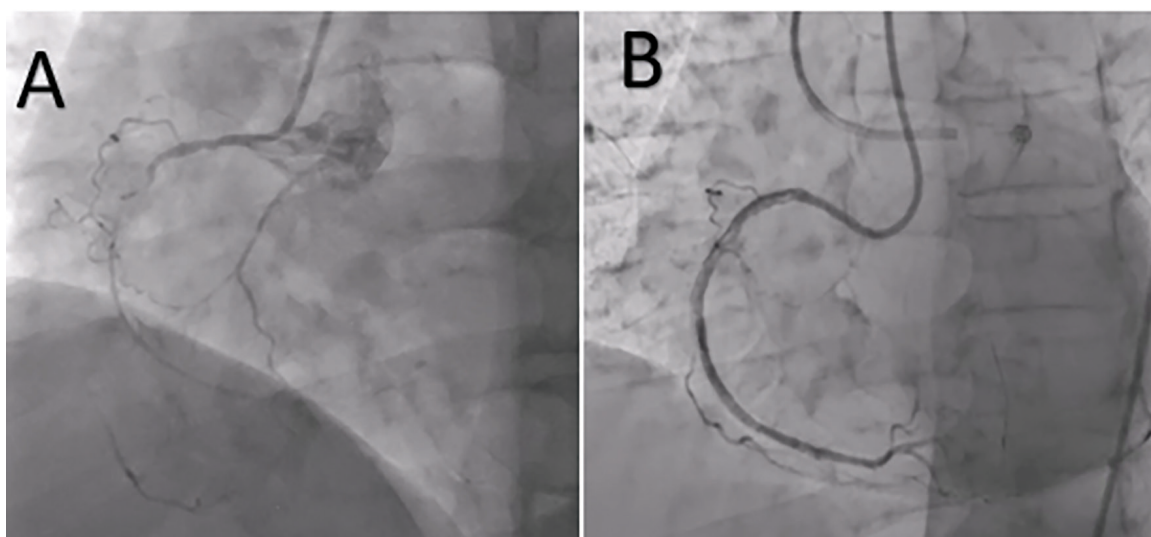


Figure 1. (A) Initial RCA CTO. (B) After dual injection: angiographic appearance of the dissected/open RCA
RCA: Right coronary artery, CTO: Chronic total occlusion

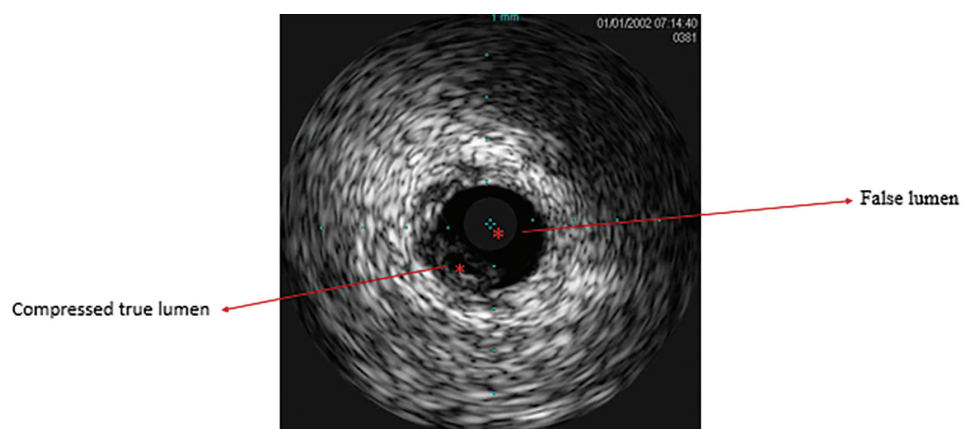


Figure 2. Intravascular ultrasound demonstrating the false lumen with compression of the adjacent true lumen

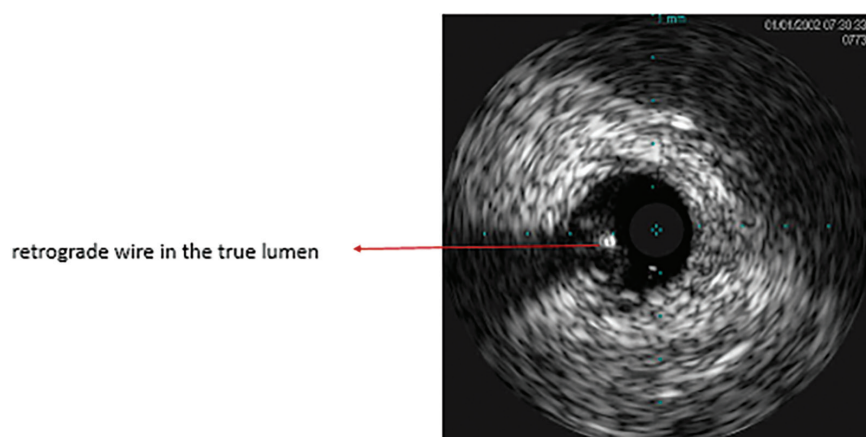


Figure 3. Intravascular ultrasound: retrograde wire in the true lumen

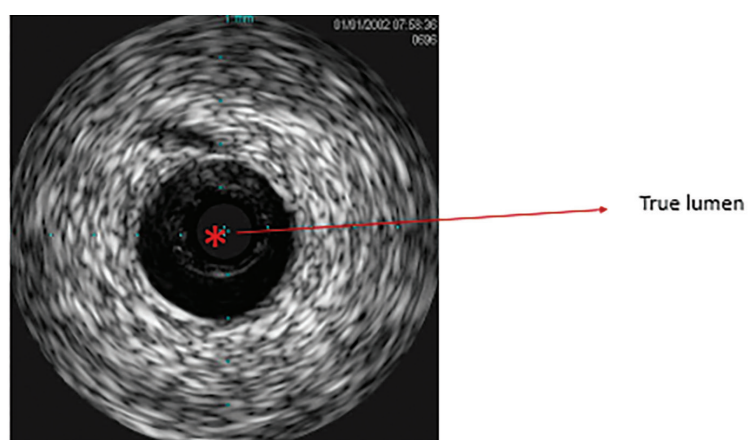


Figure 4. Intravascular ultrasound confirming true-lumen before stent implantation

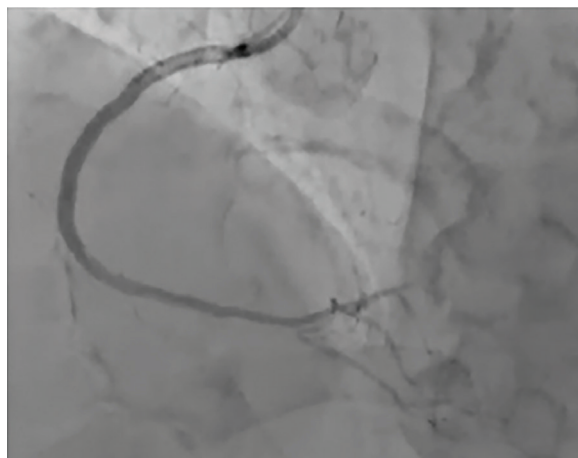


Figure 5. Final angiographic result

[OP 21]

LAD-CTO Treated with DCB

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Aim: Percutaneous coronary intervention (PCI) of chronic total occlusions (CTOs) frequently requires complex crossing strategies and stent implantation. In selected patients with diffuse disease and small vessel dimensions, a drug-coated balloon (DCB)-only strategy may limit stent length and avoid permanent coronary scaffolding. We present a challenging left anterior descending coronary artery (LAD)-CTO successfully treated using a retrograde approach and DCB angioplasty.

Case Report: A 68-year-old patient with hypertension and type 2 diabetes mellitus was admitted with a non-ST-segment elevation myocardial infarction. Coronary angiography revealed a left-dominant coronary circulation with a mid-LAD CTO, an 80% stenosis in the mid-left circumflex artery (LCx), and a small right coronary artery without significant lesions. PCI of the mid-LCx was performed with implantation of a drug-eluting stent (DES). Transthoracic echocardiography showed a left ventricular ejection fraction of 48%.

Due to persistent angina (Canadian Cardiovascular Society class II), the patient underwent cardiac magnetic resonance imaging, which demonstrated viable myocardium in the LAD territory with preserved left ventricular function. Therefore, PCI of the LAD CTO was scheduled.

Dual radial access and the ping-pong technique were used. The LAD was poorly visualized and appeared diffusely diseased (Figure 1). Antegrade wire escalation was performed using a Fielder XTA followed by a Gladius EX wire, reaching the mid-portion of the CTO segment. Retrogradely, a Sion wire was positioned in the posterior descending artery, and using a dual-lumen microcatheter, Sazuke a second Sion wire was advanced by the surfing technique through a distal septal branch into the mid-LAD. A Caravel microcatheter was then advanced to the mid-LAD over the Sion wire.

After successful kissing-wire positioning, a retrograde Gladius EX wire was advanced into an antegrade Corsair Pro XS microcatheter using the intracoronary tip-in technique (Figure 2). The antegrade microcatheter was then advanced over the retrograde wire to the level of the septal branch. Subsequently, the retrograde wire was withdrawn, and an antegrade Sion wire was advanced and introduced into the retrograde microcatheter using the intraseptal tip-in technique (Figure 3).

A Sazuke was advanced over the Sion wire, and a second guidewire (Sion Blue) was delivered to the distal LAD through the second port of the Sazuke catheter. Predilatation with 2 mm semi-compliant balloon was performed,

and intravascular ultrasound (IVUS) confirmed wire position within the true lumen. IVUS also demonstrated diffuse disease throughout the LAD, with a maximum vessel diameter of 2.5 mm in the proximal segment and 2.0 mm in the distal segment.

After predilatation with 2.5-mm and 2.0-mm semi-compliant balloons in the proximal, mid, and distal LAD, PCI was performed using 2.5-mm and 2.0-mm Soluton DCBs, achieving an excellent angiographic result (Figure 4). At 3-month follow-up, repeat coronary angiography demonstrated a patent LAD with positive remodeling and without significant residual stenosis (Figure 5).

Conclusion: The main finding of this case is the successful treatment of a poorly visualized, diffusely diseased LAD-CTO using a retrograde approach and a DCB-only strategy. IVUS demonstrated diffuse LAD disease and relatively small vessel dimensions, supporting the decision to avoid extensive stent implantation. An excellent angiographic result was achieved, with a patent LAD at 3-month follow-up.

DCBs are increasingly being incorporated into CTO PCI, particularly as part of a hybrid strategy combining DCBs and DES to minimize the length of permanent coronary scaffolding. The ERCTO registry demonstrated a clear trend toward increasing DCB use in CTO PCI, from 3.4% in 2016 to 14.9% in 2025.

This approach may be particularly attractive in diffuse disease and/or negatively remodeled segments, where extensive stenting may increase the risk of underexpansion and malapposition. In our patient, diffuse LAD disease and relatively small vessel dimensions favored a DCB-based strategy after successful CTO recanalization and optimal lesion preparation. IVUS was essential for confirming true-lumen wire position and guiding vessel sizing.

Other technical points in this case such as intracoronary tip-in was of interest as well avoiding wire externalization and in some way simplifying the case.

Although DCB-only treatment is feasible in selected CTOs, current evidence remains predominantly observational. The CTO-DENOV0 registry reported acceptable short-term outcomes, but binary restenosis occurred in 24.2% of lesions at angiographic follow-up and suboptimal predilatation was associated with an increase rate of restenosis emphasizing the importance of achieving an optimal result after lesion preparation.

In conclusion, DCB-only PCI can be considered a selective strategy particularly in cases of very diffused diseased and specially in cases of intraplaque wiring like the case presented here.

Keywords: Chronic total occlusion, left anterior descending artery, drug-coated balloon, percutaneous coronary intervention, retrograde approach

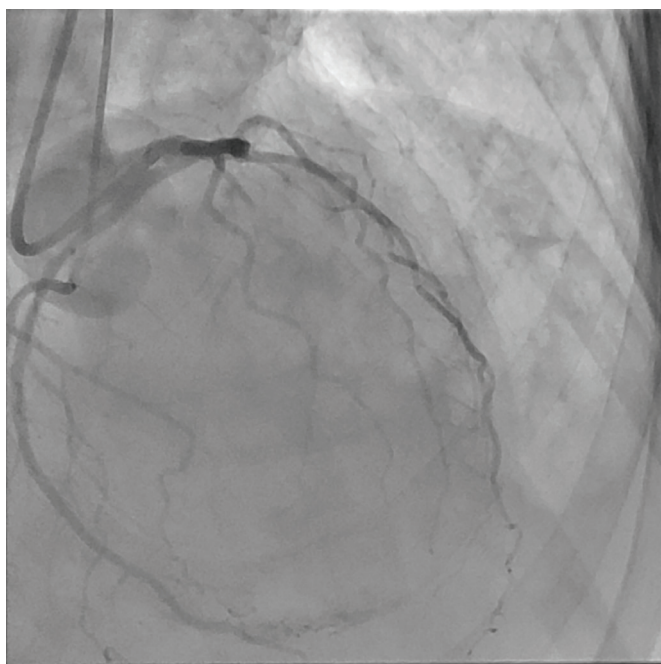


Figure 1. LAD is purely visualized and diffusely diseased

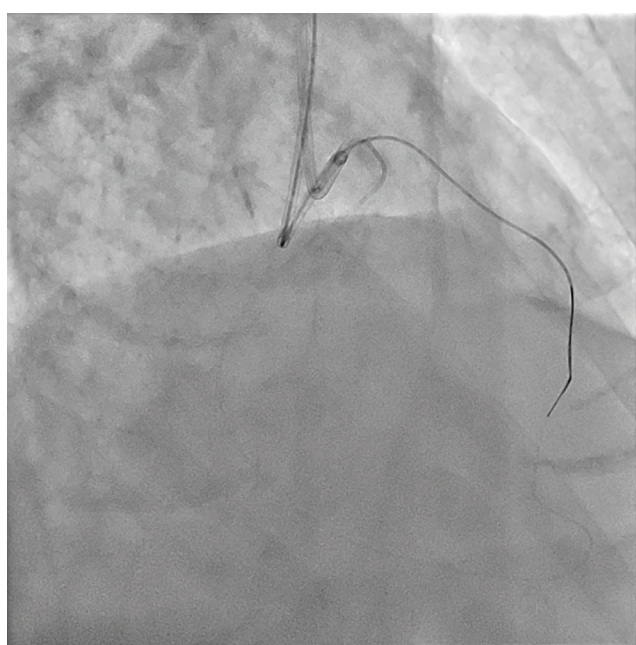


Figure 3. Intraseptal tip-in technique

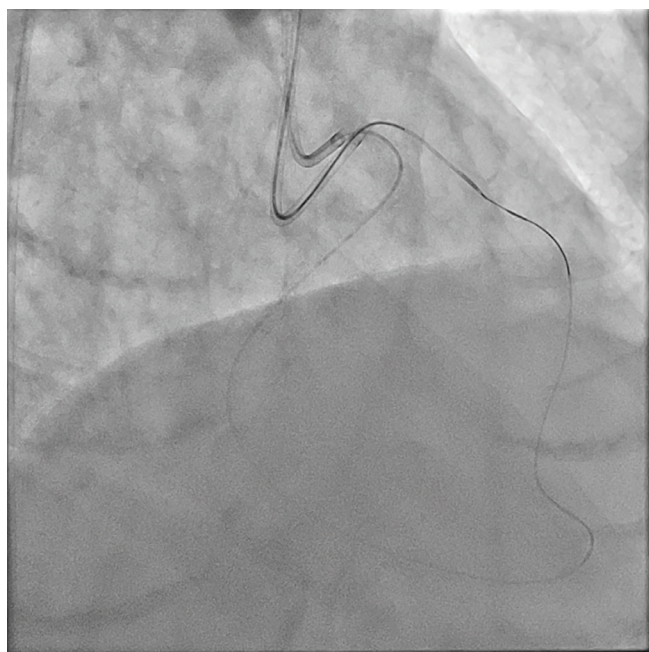


Figure 2. Kissing-wire position between the antegrade and retrograde guidewires and intracoronary tip-in technique

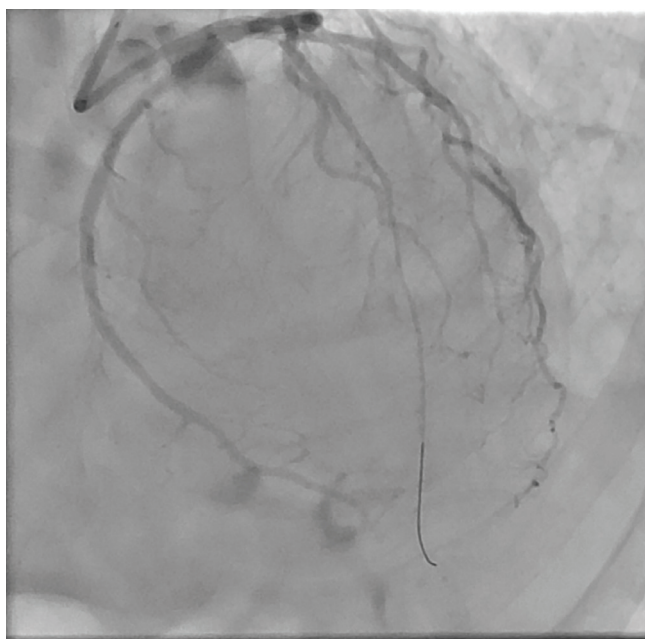


Figure 4. Successful angiographic result

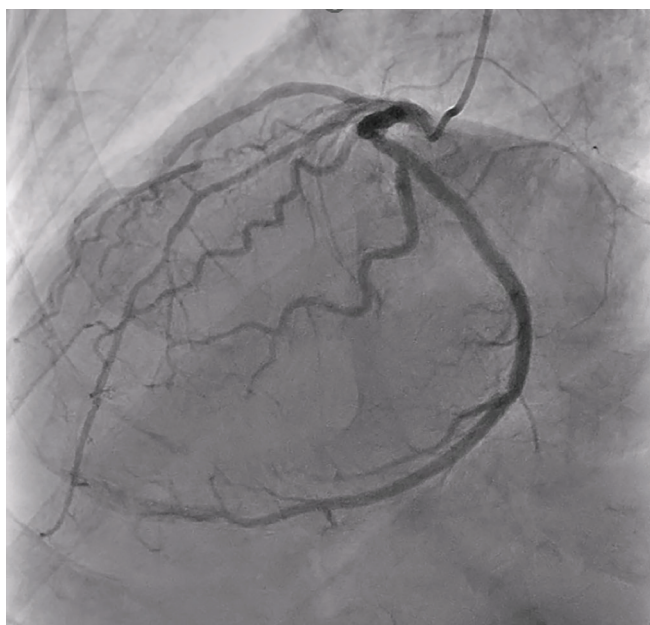


Figure 5. Three-month angiographic follow-up demonstrating a patent LAD with positive remodeling

[OP 22]

Left Anterior Descending Coronary Artery Chronic Total Occlusion Intervention

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Aim: Percutaneous coronary intervention (PCI) of chronic total occlusions (CTO) is recommended in patients with refractory angina after treatment attempt with anti-anginal medication, as in patients with non-CTO coronary lesions. Revascularization of proximal lesions, particularly in the left anterior descending artery (LAD), is associated with improved outcomes.

Case Report: The patient has been experiencing abdominal pain and shortness of breath for the past year, which occurs with exertion and lasts 5-10 minutes. The patient's abdominal pain and shortness of breath subsided with rest. The patient's ECG was normal (Figure 1). Heart rate was 79/min, blood pressure was 110/70 mm-Hg. LVEF was 60% on echocardiography. Blood test results obtained upon admission: Glucose: 110 mg/dL. Urea/creatinine: 45/0.70 mg/dL. Total cholesterol: 215 mg/dL, LDL: 118 mg/dL. HDL cholesterol: 65 mg/dL, Triglyceride: 157 mg/dL. CRP <2.0 mg/L. Hb: 13.2 g/dL. Platelet: 411.0000, HbA1c: 6.4%. The patient underwent myocardial perfusion scintigraphy due to suspected coronary artery disease. Myocardial perfusion scintigraphy revealed findings consistent with ischemia in the anterior wall in the apical midsections. The patient is undergoing coronary angiography because ischemia findings were detected on myocardial perfusion scintigraphy and angina equivalent symptoms. Coronary angiography revealed that proximal plaque in the LAD. 100% occlusion of the LAD was detected at the level of the D1 branch (Figure 2). The LAD was filling retrogradely from the RCA with grade-1. J-CTO score: 2. A 30% plaque was detected in the proximal Cx. Plaque was detected in the proximal and mid-segments of the RCA. LAD 100% CTO lesion was passed at the LAD D1 level using guidewire 0.014 with back-up balloon. Multiple dilatations were performed using a 1.5x12 mm semi-compliant balloon (Figure 3). A 2.5x34 mm sirolimus eluting stent was implanted (Figure 4). Full dilation was achieved (Figure 5). Medical treatment was prescribed as follows: acetylsalicylic acid 100 mg once daily, ticagrelor 90 mg twice daily, metoprolol 50 mg once daily, irbesartan 300 mg/ amlodipin 10 mg/HCTZ 12.5 mg once daily atorvastatin 40 mg once daily, and pantoprazole 40 mg once daily.

Conclusion: CTO is characterized by complete occlusion of anterograde blood flow (TIMI grade 0 flow) in the coronary artery, presented more than 3 months. Approximately 16-31% of patients with chronic coronary syndromes undergoing coronary angiography have a CTO. CTO PCI represents one of the most advanced fields of interventional cardiology. Revascularization is indicated if symptoms persist despite optimal medical treatment (OMT). CTO lesions are difficult to treat and prone to complications in relation to the PCI procedure. Identifying CTO subgroups for optimal treatment selection is valuable. It has been debated if the symptomatic and prognostic effect of PCI is better than OMT alone. Owing to the complexity of CTO-PCI, only 10-15% of CTO patients attempted to receive interventional revascularization. Revascularization of proximal lesions, particularly in the LAD is associated with improved outcomes. These findings are confirmed in observational data, where successful revascularization of LAD CTO lesions is associated with equal outcomes as non-CTO LAD lesions. In contrast, unsuccessful revascularization is associated with poorer outcomes driven by lesions located in the proximal vessel segment.

Keywords: Chronic total occlusion, percutaneous coronary intervention, LAD lesion

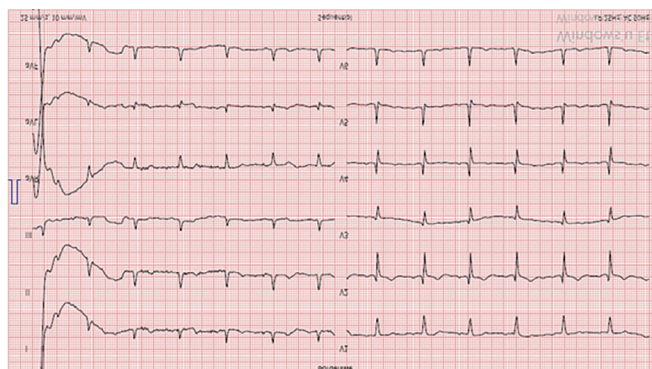


Figure 1. ECG taken 3 months before coronary angiography

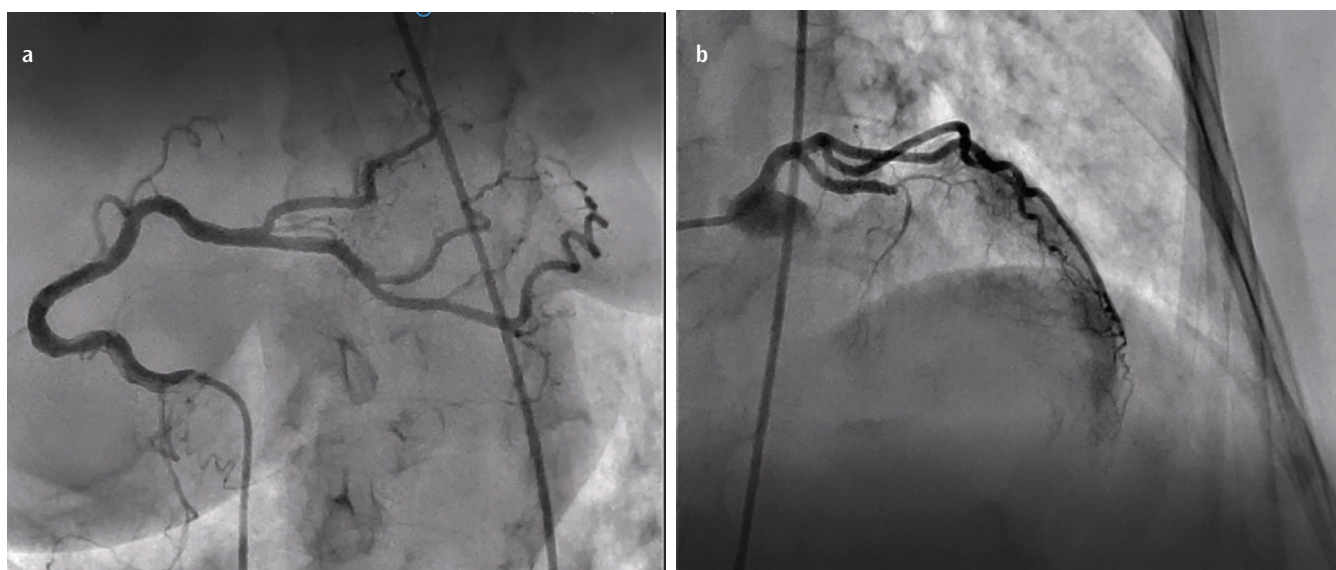


Figure 2. Coronary angiography imaging

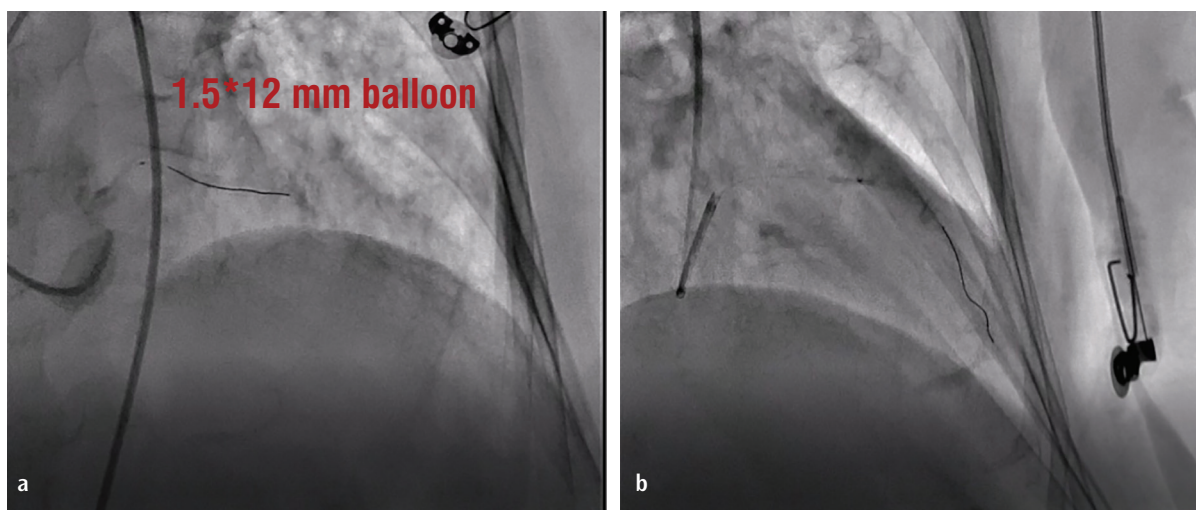


Figure 3. LAD 100% CTO lesion was passed at the LAD D1 level using guidewire 0.014 with back-up balloon

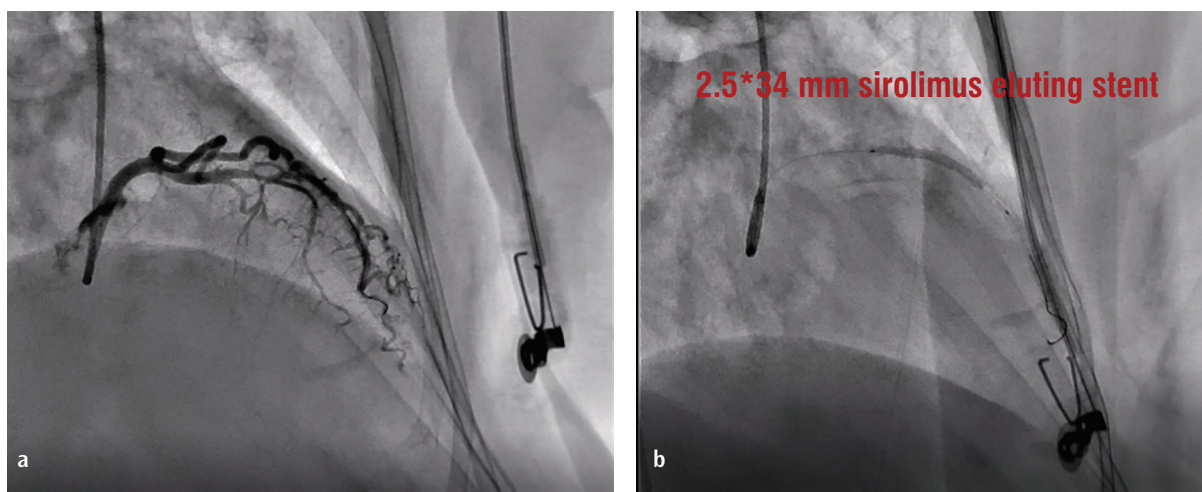


Figure 4. 2.5x34 mm sirolimus eluting stent was implanted

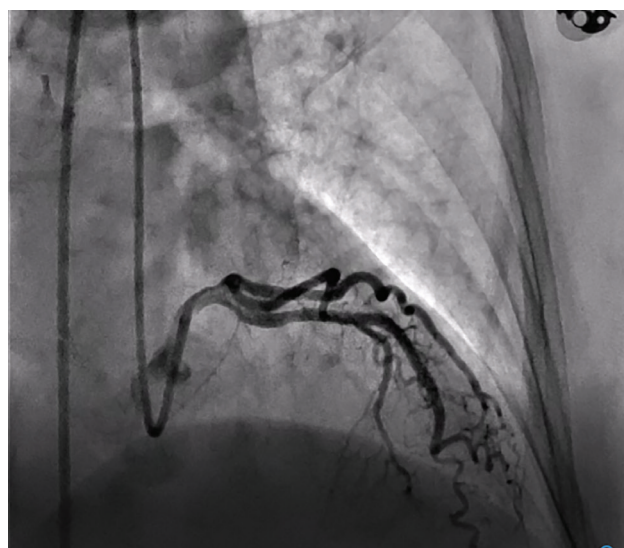


Figure 5. Coronary angiographic imaging after stent implantation

[OP 23]**Excimer Laser Coronary Angioplasty for In-Stent Restenosis and CTOs Clinical Experience**

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Aim: Percutaneous coronary intervention with drug-coated balloon (DCB) angioplasty is an established treatment for in-stent restenosis (ISR). The benefit of adjunctive excimer laser coronary atherectomy (ELCA) before DCB for ISR and in-stent chronic total occlusions (CTOs) is not well defined.

Methods: We enrolled 28 consecutive patients with ISR (n=20) or in-stent CTO (n=8) treated with ELCA followed by DCB angioplasty. Quantitative coronary angiography (QCA) was performed to measure minimal lumen diameter and percent diameter stenosis; the primary endpoint was percent diameter stenosis.

Results: Procedural success was achieved in 27/28 patients (96.4%). One patient with a two-layer stent ISR had a residual stenosis of 60%. Three patients required additional stenting after ELCA. A 0.9 mm ELCA catheter was used in 64.3% of cases; both 0.9 mm and 1.4 mm catheters were used in 35.7%.

Conclusion: In this small case series, ELCA followed by DCB appeared safe and provided favorable immediate angiographic results by QCA without an apparent increase in peri-procedural complication rates.

Keywords: In-stent restenosis, excimer laser coronary atherectomy, chronic total occlusion, drug-coated balloon

[OP 24]**Beyond Angina Relief: Native RCA CTO PCI as a Rescue Therapy for Recurrent Ventricular Tachycardia**

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Aim: Chronic total occlusion (CTO) PCI is traditionally performed to relieve angina and improve myocardial ischemia. However, in selected patients with recurrent ventricular tachycardia (VT), revascularization of a CTO may have a broader therapeutic role by targeting a potentially ischemic and arrhythmogenic myocardial substrate.

Case Report: A 71-year-old man with diabetes mellitus, hypertension, and previous coronary artery bypass grafting (CABG) 10 years earlier presented to the emergency department with hemodynamic collapse. His admission electrocardiogram revealed sustained monomorphic VT (Figure 1). Immediate synchronized cardioversion restored sinus rhythm and stabilized his hemodynamic status. Transthoracic echocardiography demonstrated global left ventricular hypokinesia with moderately reduced systolic function (left ventricular ejection fraction approximately 40%).

Coronary angiography revealed patent left internal mammary artery-left anterior descending artery (LAD) graft and only mild, non-obstructive disease in the left circumflex artery. In contrast, the native right coronary artery (RCA) was completely occluded, while the saphenous vein graft to the RCA (SVG-RCA) was also totally occluded. The distal RCA was supplied by collateral flow from the distal LAD through septal channels and from obtuse marginal branches through epicardial collaterals (Figure 2). Given the preserved perfusion of the left coronary system and the anticipated technical complexity of CTO PCI in a post-CABG patient, the initial Heart Team decision was to pursue conservative management with optimal medical therapy.

The clinical course subsequently changed. On the second day of hospitalization, despite optimal antiarrhythmic therapy, the patient developed recurrent episodes of sustained VT requiring repeated interventions. The recurrent electrical instability raised concern for an ischemic arrhythmogenic substrate within the inferior and posterolateral myocardial territory supplied by the RCA. Following multidisciplinary reassessment, the Heart Team decided to attempt revascularization of the native RCA CTO as a rescue strategy.

The procedure was performed via a bifemoral approach. An EBU 3.5 guiding catheter was used for the left coronary system, while an AL2 guiding catheter engaged the native RCA. Antegrade wire escalation was initially attempted with a Gaia Next 2 guidewire; however, the proximal cap could not be penetrated. A retrograde strategy was therefore pursued through the epicardial collateral circulation.

Initial attempts to navigate the highly tortuous epicardial collateral channels using a Corsair Pro XS microcatheter with Suoh 0.3 and Sion Black guidewires were unsuccessful. A Sion Blue guidewire supported by a Finecross microcatheter subsequently succeeded in crossing the epicardial collateral and reaching the distal RCA. Nevertheless, retrograde penetration of the CTO segment remained unsuccessful despite escalation to Gladius EX and Gaia Next 3 guidewires.

An antegrade knuckle-wire strategy was then performed using a Fielder XT-A guidewire. The knuckle entered the subintimal space but propagated toward a side branch rather than the distal true lumen. Given the unfavorable wire position, the strategy was converted to Reverse CART. After repeated attempts with progressively larger non-compliant balloons, a connection between the antegrade and retrograde spaces was successfully created (Figure 3). The retrograde guidewire was advanced into the ascending aorta, followed by a tip-in maneuver and subsequent externalization with an RG3 guidewire (Figure 4).

Sequential balloon predilatation was performed, followed by implantation of drug-eluting stents along the occluded RCA. Final angiography demonstrated restoration of TIMI 3 antegrade flow, complete RCA revascularization, and preservation of all major side branches. No major procedural complications occurred (Figure 5).

Conclusion: This case highlights a potential role for CTO PCI that extends beyond conventional symptom relief. The patient presented with sustained monomorphic VT and continued to experience recurrent ventricular arrhythmias despite appropriate antiarrhythmic therapy. In this setting, the RCA CTO was considered a potential contributor to the arrhythmogenic substrate involving the inferior and posterolateral myocardial territory. Although a direct causal relationship between the CTO and VT cannot be definitively established, the persistence of electrical instability despite medical therapy provided a compelling rationale for revascularization.

The intervention itself illustrates the complexity of CTO PCI in patients with previous CABG. Failure of initial antegrade wire escalation, severe tortuosity of the epicardial collateral pathway, and unsuccessful retrograde CTO crossing necessitated a sequential escalation strategy culminating in Reverse CART, tip-in, and RG3 externalization. Despite these technical challenges, successful RCA recanalization was achieved without major complications.

Importantly, the objective of revascularization in this case was not simply restoration of coronary patency. By eliminating a potentially ischemic substrate associated with ventricular electrical instability, CTO PCI may contribute to arrhythmic stabilization in carefully selected patients. This case therefore emphasizes that, beyond angina relief, CTO revascularization may represent a potential rescue strategy in patients with recurrent VT when conventional medical therapy fails.

Keywords: Ventricular tachycardia, chronic total occlusion, recanalisation, percutaneous coronary intervention

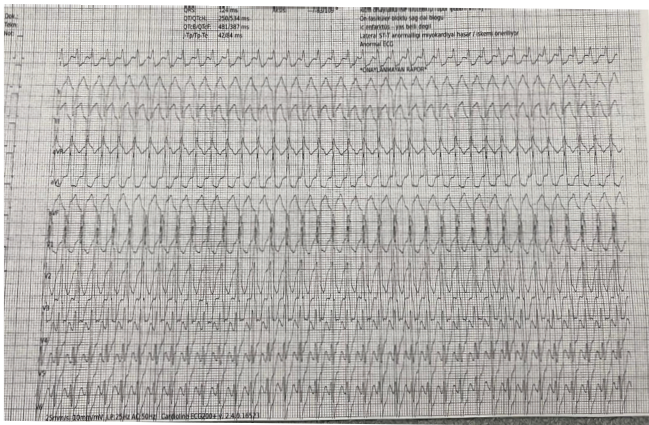


Figure 1. ECG at admission

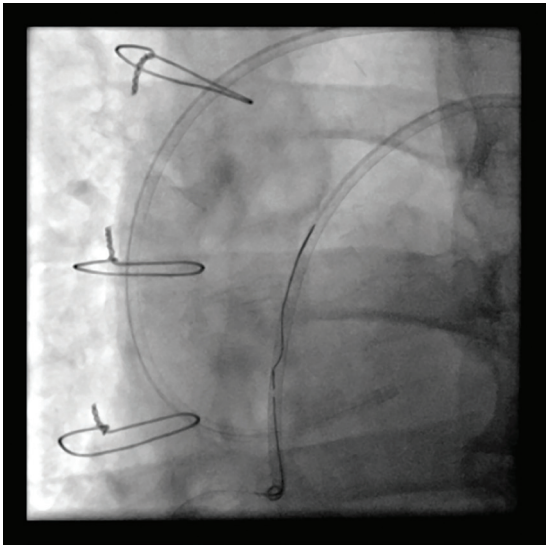


Figure 4. Extracatheterization step

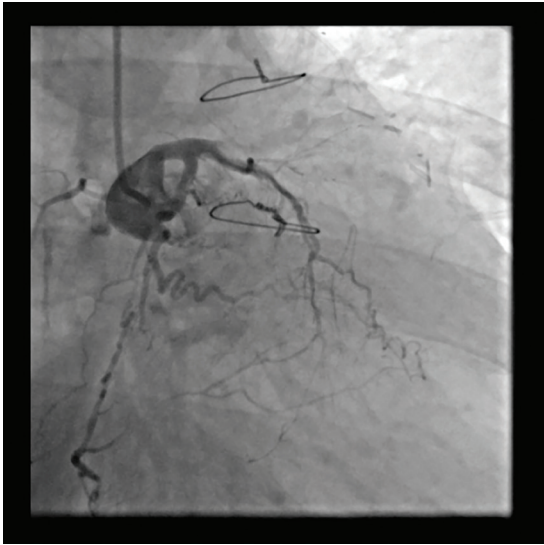


Figure 2. Epicardial retrograde filling of the distal right coronary artery

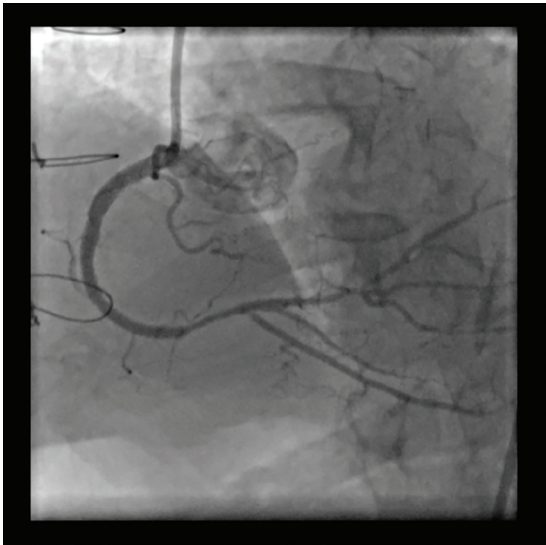


Figure 5. Final result

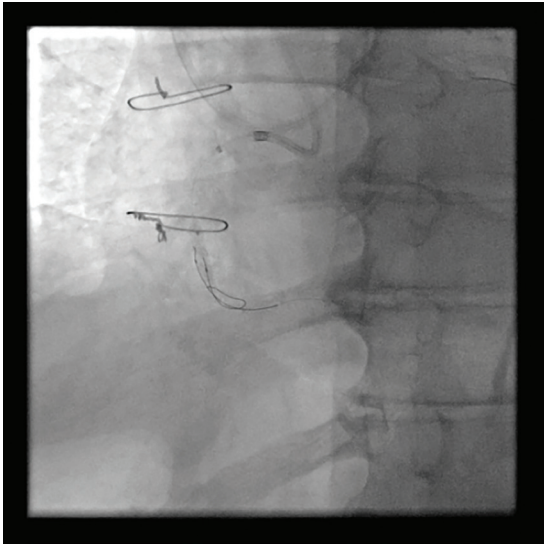


Figure 3. Reverse CART

[OP 25]**Multiple Wire Crossing Techniques via Retrograde Side**

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A 56-year-old man with a history of HTN, CCS was referred us for CTO PCI because of persistent pectoralis exertional angina despite full MFU. Previous CAG showed a total occlusion LAD ostium with an ambiguous proximal cap and significant stable plaque at om1 and RCA. CABG was refused by patient. LAD was filled via CCO septal collaterals from PDA. A short LM anatomy limited acceptable left guiding alignment and support for AWS and lesion preparation for reverses CART. Due to ambiguous proximal cap, we decided to primary retrograde approach. A septal collateral was successfully crossed with SIONBLACK after multiple micro-tip injection and wire surfing. A 2.6 "micro catheter couldn't follow the wire, so we had to change to a 1.7" micro catheter, that crossed septal branch up to proximal part of LAD. many attempts with Gladius M wire were failed to cross CTO length and enter to LM true lumen. Finally, GAIA 3rd could cross to LM and was trapped in antegrade guiding and followed by advancement of retrograde microcatheter. Wire externalization was done by RG3 wire. A dual lumen microcatheter was advanced on RG3 wire via antegrade guiding to help wiring of distal part of LAD with a workhorse wire. After right gear check, RG3 was pulled out. First predilation of LAD was done when a balloon was inserted from LM to LCX because of safety reasons, then a stent was implanted from LM to LAD. after first POT and rewiring of LCX, FKB was done, followed by final POT. The procedure was completed without major complication and restoration of TIMI 3 flow.

[OP 26]**No Septals, No Retrograde: Antegrade PCI of a Flush Aorto-Ostial RCA CTO With Chronic LAD Dissection Antegrade PCI of a Flush Ostial RCA CTO**Fatih Kahraman¹, Sebahat Şengül², Recep Gülmez¹, İbrahim Altun³, Burak Ayca⁴, Hilal Yıldız¹¹Kütahya Health Sciences University Faculty of Medicine, Kütahya²Uşak University Faculty of Medicine, Uşak³Muğla Sıtkı Kocman University Faculty of Medicine, Muğla⁴Buca Seyfi Demirsoy Research and Training Hospital, İzmir

Aim: Flush aorto-ostial right coronary artery (RCA) chronic total occlusions (CTOs) are particularly challenging because the proximal cap may be ambiguous or impossible to engage. Although retrograde crossing is frequently required, antegrade recanalization may remain feasible when collateral access is unsuitable.

Case Report: A 54-year-old man with hypertension, no other conventional risk factors, and coronary artery disease with previous left anterior descending (LAD) and circumflex (CX) artery stenting presented with typical exertional angina persisting for several months. Coronary angiography in May 2025 demonstrated an RCA CTO, a patent mid-CX stent without critical restenosis, and a suboptimal result following PCI for LAD in-stent restenosis. Electrocardiography showed sinus rhythm. Transthoracic echocardiography demonstrated preserved left ventricular systolic function (ejection fraction 60%), RCA-territory hypokinesia, and no significant valvular heart disease.

Laboratory findings and vital signs were unremarkable. Because of refractory symptoms, the patient was referred for RCA CTO PCI.

The procedure was performed in January 2026 using right femoral and right radial access. Meticulous re-evaluation of the previous angiogram-initially reviewed with attention focused on the RCA CTO-revealed a prominent chronic dissection distal to the LAD stent that had not previously been recognized. This finding altered procedural planning, and a safety guidewire was placed in the mid-LAD but could not be advanced distally.

The RCA lesion was a calcified, long (≥ 20 mm), flush aorto-ostial CTO with a blunt proximal cap and no marked bending, yielding a J-CTO score of 3; the previous-attempt component was unavailable. The distal RCA filled well through septal collaterals (Rentrop grade 3). A JR4 catheter could not engage the RCA ostium. An EBU 3.5 7-Fr guiding catheter was therefore engaged in the left main coronary artery, and a septal retrograde strategy was attempted.

The ostia of the septal branches arising through the proximal LAD stent were occluded. Despite dual-lumen microcatheter support and repeated attempts using Samurai, Samurai RC, Sion Black, and SUOH 03 guidewires shaped to approximately 90°, no septal channel could be entered. Careful angiographic assessment showed that the chronic LAD dissection prevented access to the same lumen as the target septal branches and also explained the failure of the LAD safety wire to advance distally. Diffuse ST-segment depression developed during the LAD attempts, without haemodynamic deterioration. The retrograde strategy was consequently abandoned.

Attention shifted to a purely antegrade approach. A Gladius EX 14 guidewire, initially unable to enter the true ostial lumen, was carefully manipulated across the flush proximal cap and into the RCA. Contralateral collateral injection confirmed its course within the vessel, representing the pivotal manoeuvre of the procedure. Severe proximal resistance then prevented advancement of a Mamba Flex microcatheter. Sequential dilatation with five low-profile balloons (1.0, 1.20, 1.25, 1.50, and 2.0 mm; largest balloon 2.0×25 mm) created a passage through the device-uncrossable segment. A Corsair Pro XS microcatheter subsequently crossed the CTO. Following repeated balloon angioplasty, intravascular ultrasound-guided stent implantation achieved an excellent final angiographic result with TIMI grade 3 flow.

Conclusion: Aorto-ostial CTOs are uncommon and technically demanding because the absent stump limits guide engagement and proximal-cap localization. Contemporary registry data demonstrate lower technical success than for non-ostial CTOs and frequent reliance on retrograde crossing. In this case, however, the apparent retrograde opportunity provided by Rentrop grade 3 collateral filling proved unusable: the septal origins within the LAD stent were occluded, while an unrecognized chronic LAD dissection prevented safe access to the appropriate lumen.

The case highlights three practical lessons. First, CTO planning requires systematic review of the entire coronary tree, not solely the target vessel. Second, angiographically robust collateral filling does not necessarily indicate an interventional collateral; channel origin, course, and donor-vessel integrity must all be considered. Third, after successful guidewire crossing, severe proximal resistance may still render the lesion device-uncrossable. Here, contralateral injection confirmed antegrade wire position, while graded low-profile balloon dilatation enabled microcatheter delivery and subsequent IVUS-guided stenting. Thus, selected flush aorto-ostial RCA CTOs can be treated antegradely when the retrograde route is anatomically precluded, provided that operators use careful distal visualization, structured equipment escalation, and intravascular imaging.

Keywords: Chronic total occlusion, aorto-ostial occlusion, right coronary artery, antegrade crossing, intravascular ultrasound

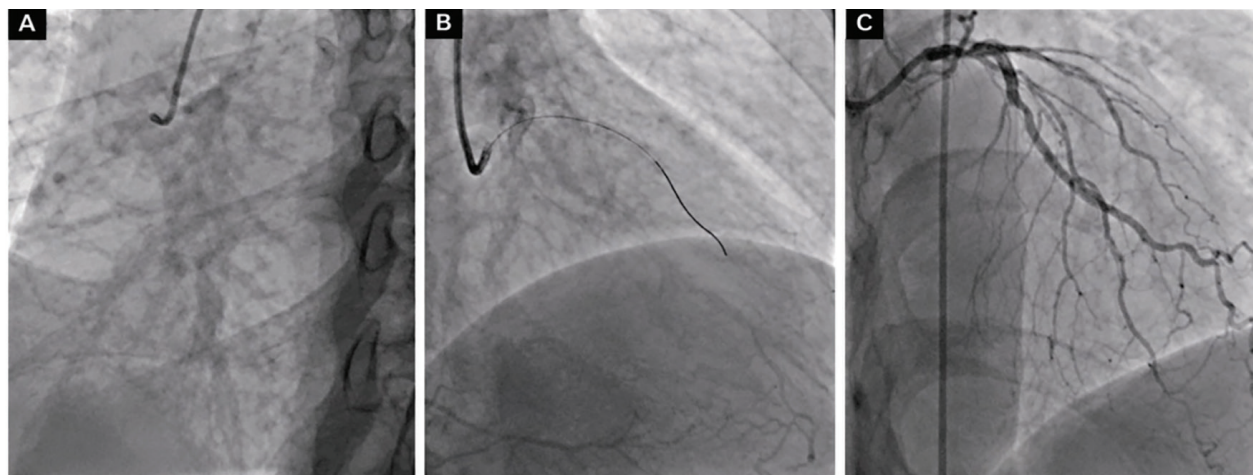


Figure 1. Baseline anatomy and chronic LAD dissection. (A) Flush aorto-ostial RCA CTO without an identifiable proximal stump. (B) Contralateral injection showing Rentrop grade 3 collateral filling of the distal RCA. (C) Re-evaluation of the left coronary angiogram demonstrating chronic dissection distal to the LAD stent (arrow)

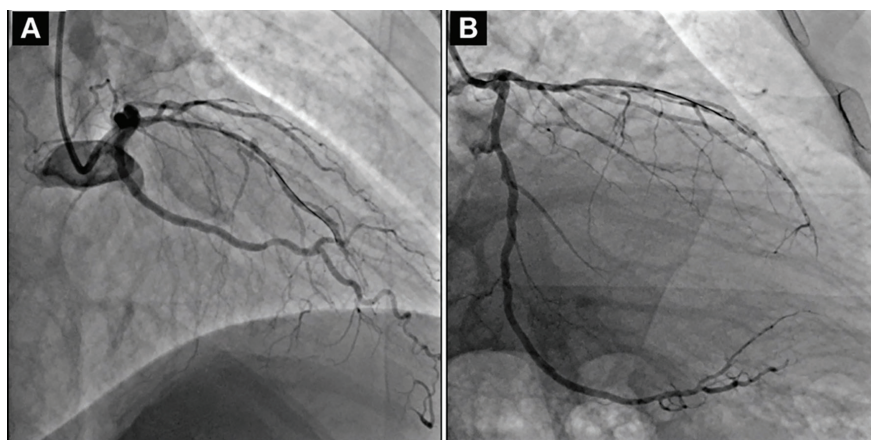


Figure 2. Unsuccessful septal retrograde approach. EBU 3.5 7-Fr guiding catheter engaged in the left main coronary artery. Attempts to enter the occluded septal origins arising through the proximal LAD stent. Wire tip is marked by arrow

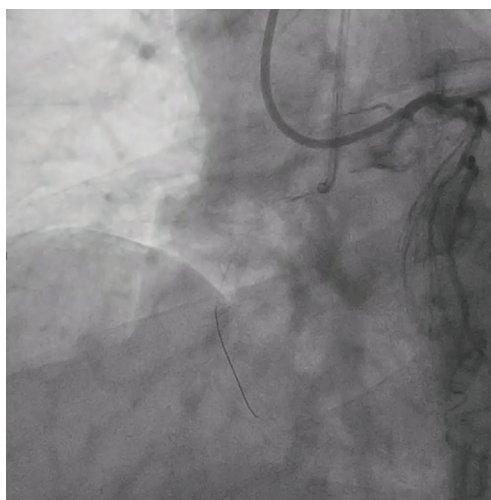


Figure 3. Pivotal antegrade ostial crossing. Gladius EX 14 guidewire directed across the flush RCA proximal cap



Figure 4. Management of the device-uncrossable proximal segment. Successful passage of the Corsair Pro XS microcatheter

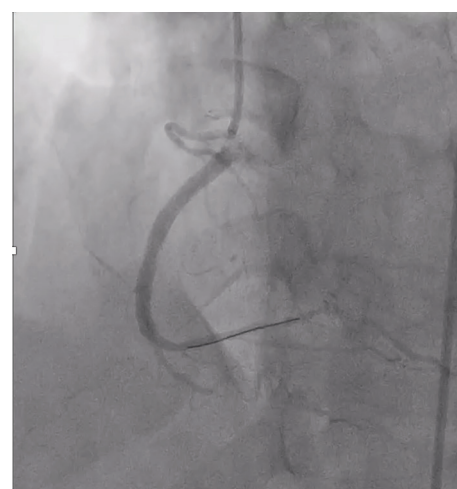


Figure 5. Final angiogram demonstrating successful RCA recanalization with TIMI grade 3 flow

[OP 27]**Successful Recanalization of an RCA In-Stent CTO Using Guide-Extension Reverse CART and Stent Crush**Murat Yiğitbaşı*Clinic of Cardiology, Ankara Bilkent City Hospital, Ankara*

A 71-year-old woman with diabetes mellitus, hypertension, and hyperlipidemia was admitted for RCA CTO PCI because of persistent CCS class III angina despite medical therapy. She had a history of previous PCI and stent implantation in the RCA, CX, and LAD. In October 2025, she presented with NSTEMI and underwent implantation of two DESs for a thrombotic total occlusion of the CX. The same angiogram demonstrated a severely calcified proximal LAD lesion and a chronic total occlusion within the proximal RCA stent segment. An attempt to treat the LAD lesion in November 2025 failed because adequate lesion expansion could not be achieved despite high-pressure balloon dilatation. In June 2026, LAD PCI was successfully completed after lesion preparation with an OPN balloon. Baseline echocardiography showed an LVEF of 60%, with mild mitral and mild aortic regurgitation.

For the RCA CTO procedure, a 6 F EBU 3.5 guiding catheter was engaged in the LMCA via the left radial artery, and a 7 F AL1 guiding catheter was engaged in the RCA via the right radial artery. Dual injection was performed. Antegrade crossing was attempted with Miracle Neo 3, Gaia Next 3, and Conquest Pro 12

wires supported by a Corsair Pro XS microcatheter, but the CTO segment could not be crossed.

A retrograde strategy was therefore adopted. Initial septal surfing attempts through the first septal branch were unsuccessful. The second septal branch was subsequently crossed with a SUOH-03 wire, the microcatheter was advanced into the distal RCA, and distal true-lumen position was confirmed. Retrograde crossing was then attempted using Gladius EX 14, Gladius MG, Gaia Next 2, and Gaia Next 3 wires. However, true-to-true crossing could not be achieved, and the retrograde wire entered the extraplaque space. Therefore, a more distal reverse CART was planned.

The procedure was switched back to the antegrade approach, and the CTO segment was crossed with a Gladius EX 14 wire outside the struts of the previous stent, in a subintimal plane. A Guidezilla 2 guide-extension catheter was advanced over the antegrade wire. After creating an appropriate connection zone with a 3.0×10 mm NC balloon, guide-extension reverse CART was successfully performed using a retrograde Pilot 200 wire. The retrograde wire was advanced into the guide-extension catheter, followed by the microcatheter, and a 330 cm RC3 wire was externalized.

After predilatation with a 2.5×15 mm balloon, 2.5×31 mm, 3.0×38 mm, 3.5×38 mm, and ostial 4.0×14 mm DESs were implanted from the distal RCA to the ostium. Because the antegrade wire had tracked outside the struts of the previous RCA stent, the old RCA stent was crushed against the vessel wall by the newly implanted stent during proximal reconstruction. Final angiography demonstrated TIMI 3 flow. Post-procedural echocardiography showed no pericardial effusion.

[OP 28]

Acute Anterior STEMI Treated with Retrograde CTO PCI Through a Degenerated SVG in a Prior CABG Patient: A Challenging CTO Case

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Aim: Acute coronary syndromes occurring in patients with prior coronary artery bypass grafting present unique clinical and technical challenges. When conventional antegrade approaches are unfeasible, utilizing saphenous vein grafts (SVG) as conduit pathways provides an essential alternative route for successful retrograde percutaneous revascularization and clinical stabilization.

Case Report: A 78-year-old male patient with hypertension and chronic kidney disease, who underwent LIMA-LAD and SVG-diagonal CABG in 1998, was scheduled for coronary angiography due to CCS-3 angina that had persisted for 6 months. Coronary angiography revealed LMCA 50%, proximal LAD chronic total occlusion (CTO), LIMA with string appearance, critical stenosis at the SVG-diagonal anastomosis, and a critical ostial lesion in the RCA. Successful percutaneous coronary intervention (PCI) was performed on the RCA. Due to an EF of 30%, myocardial perfusion scintigraphy showed viability in the LAD area, leading to a planned elective LAD CTO PCI with a J-CTO score of 3 (lesion length 20 mm, blunt stump, calcification) (Figure 1). However, while awaiting the procedure, the patient presented to the emergency room with pressure-type chest pain. Anterior STEMI (Figure 2) was detected on the ECG, and emergency PCI was planned. A bifemoral 7F sheath was placed, and the LMCA CLS-4 and saphenous graft were cannulated with AL-1 guiding. Within the AL-1 guiding, a Sion Blue wire was advanced diagonally, and a Caravel MC was parked over it. When the lesion could not be traversed with a Corsair Pro XS Pi200 wire during an antegrade approach, a retrograde CTO strategy was initiated via the SVG-diagonal. With the support of the Caravel MC, the CTO lesion was traversed using Gaia Second (Figure 3). The Caravel MC was advanced to the proximal true lumen. Then, using the tip-in technique, an antegrade Pi200 wire was inserted into the MC. The Pi200 was sent distal to the LAD. Subsequently, the Corsair Pro XS MC was advanced antegradely and replaced with a Choice Floppy. Following successive predilatations, DES extending from the LMCA to the LAD was performed. At the end of the procedure, TIMI 3 flow was achieved (Figure 4), ST elevations on the ECG regressed (Figure 5), and the patient's chest pain completely resolved.

Conclusion: This case demonstrates the feasibility and clinical utility of utilizing SVG as a conduit pathway for retrograde CTO-PCI during acute high-

risk scenarios. In patients with prior coronary bypass surgery presenting with acute myocardial infarction or hemodynamic instability, achieving rapid and durable revascularization is paramount. When culprit native arteries or traditional access routes are inaccessible or antegrade re-entry fails, retrograde navigation via SVG offers a valuable rescue strategy.

Although navigating SVG carries inherent risks-such as graft degeneration, acute thrombus embolization, or vascular perforation-careful wire manipulation, appropriate microcatheter support, and cautious balloon dilation significantly reduce procedural complications. Interventional cardiologists should maintain high awareness of SVG conduits when planning complex revascularization in post-CABG patients. Ultimately, tailored retrograde access strategies leveraging patent SVG represent a critical option to restore adequate myocardial perfusion and ensure clinical recovery when conventional approaches are unsuccessful.

Keywords: Chronic total occlusion, retrograde CTO-PCI, coronary artery bypass grafting, saphenous vein graft, STEMI

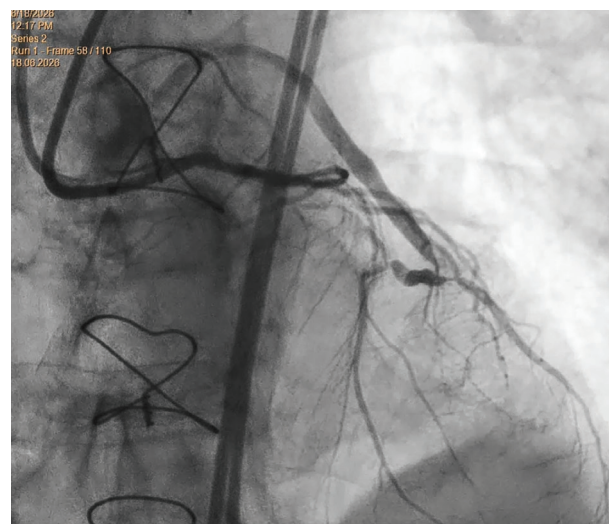


Figure 1. Dual angiogram (projection RAO 1°/CRA 22°): chronic total occlusion of the prox. LAD. Lesion length >20 mm, blunt stump, severely calcified (JCTO >3)

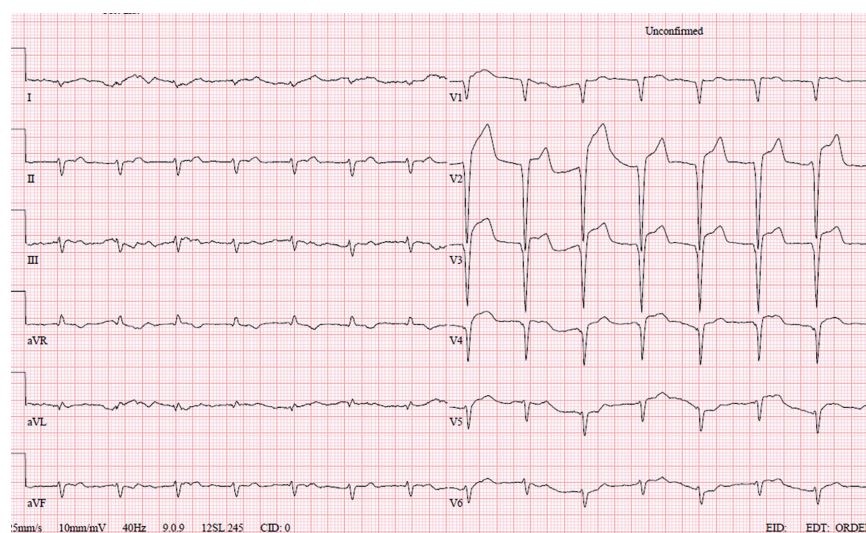


Figure 2. Anterior STEMI ECG



Figure 3. Angiogram (projection LAO 0°, CRA 22°): retrograde passage with Caravel microcatheter and Gaia second through the saphenous vein graft



Figure 4. Angiogram (projection LAO 0°, CAUD 20°): final angiographic result after 2 DES implantation with TIMI 3 flow in the LAD

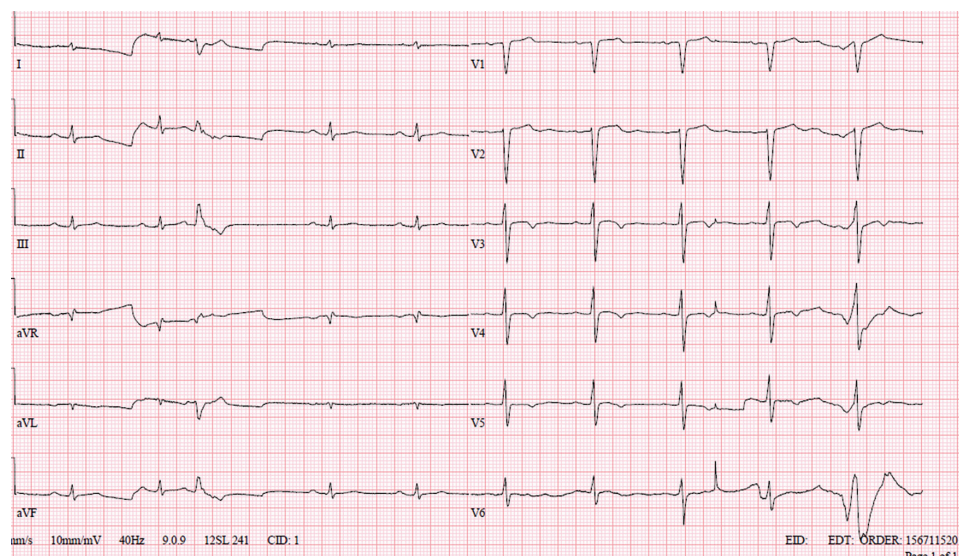


Figure 5. ECG 1 month after PCI
PCI: Percutaneous coronary intervention