PRESENTATIONS

A Case of RCA Retrograd CTO, Revascularized via LAD Epicardial Collaterals to RCA

Abdullah Tunçez, Bülent Behlül Altunkeser

Department of Cardiology, Selçuk University Faculty of Medicine, Konya

A 63 years old male patient, presented to our cardiology outpatient clinic with Canadian Angina Classification Class 2-3 angina pectoris. He had hypertension and currently smoking. His transthoracic echocardiography showed normal left ventricular funcitons, no wall-motion abnormalities and mild to moderate mitral regurgitation. We performed invasive coronary angiography and we showed chronic total occlusion (CTO) of right coronary artery (RCA) at the mid level. His spect analysis showed ischemia at inferior segments. We decided to perform RCA CTO revascularization procedure. First of all we inserted a diagnostic catheter to the left main coronary artery and a Amplatz left-1 (AL-1) guiding catheter to the RCA. Bilateral dual enjections performed to analyze the coronary collateral status and we decided to go on firstly the antegrad way and we want to use the left anterior descending artery (LAD) epicardial collateral as last chance. Antegrad attempts with various guidewires like miracle 6 and miracle 12 were failed. We tried to perform parallel wire technique to cross the lesion with also using the conquest pro 12. But we failed. After this we decided to use the retrograd way from a epicardial collateral from LAD to the distal RCA. We reached to the distal of the total occlusion with sion blue. After that we used retrogradely the conquest pro 12 and finally we crossed the lesion. After that we used RG3 guidewire to convert the all system from retrograd way to the antegrad way and we finished the procedure without any complication. First, in this case report, we wanted to emphasize the importance of thoroughly preparing patients and carefully evaluating collateral circulation between coronary arteries before the procedure. Second, although epicardial collaterals are a last option due to their nature, they are valuable for case success.

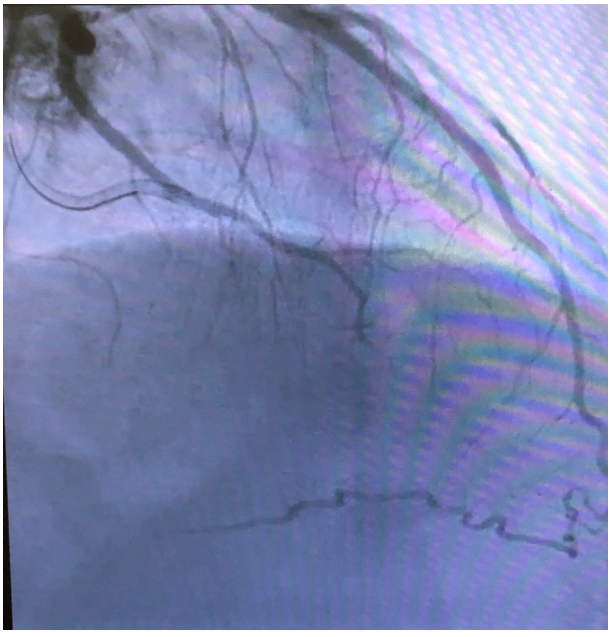


Figure 1. Bilateral injections

All Road Lead to True Lumen: A Case of RCA CTO which Successfully Revascularized via an Epicardial Collateral Originated from RCA Conus Branch to Distal RCA

Abdullah Tunçez, Bülent Behlül Altunkeser

Department of Cardiology, Selçuk University Faculty of Medicine, Konya

A 76 years old male patient, referred to our cardiology outpatient clinic with Canadian Angina Classification Class 2-3 angina pectoris. He had diabetes mellitus and hypertension. His transthoracic echocardiography showed normal left ventricular funciton, no wall-motion abnormalities and mild mitral regurgitation. His previous coronary angiography showed chronic total occlusion (CTO) of right coronary artery (RCA) at the mid level. His spect analysis showed severe ischemia at inferior segments. We decided to perform RCA CTO revascularization procedure. First of all we inserted a diagnostic catheter to the left main coronary artery and a radial extra backup (REBU) guiding catheter to the RCA. Antegrad attempts with various techniques (parallel guidewire technique e.g.) and with various guidewires like miracle series were failed. After these antegrad efforts, we decided to use the retrograd way from a epicardial collateral originated from the conus branch of RCA to the distal RCA. There was no good septal or epicardial collaterals from LAD to RCA. We reached to the distal of the total occlusion with sion blue. After that we used various guidewires while we were escalating the wires such as miracle 6, ultimate bros 3 and finally conquest pro 12. Finally, conquest pro 12 successfully crossed the CTO lesion retrogradely. After that we used RG3 guidewire to convert the all system from retrograd way to the antegrad way and we finished the procedure without any complication. In this case report, we first wanted to emphasize that thorough preparation of the patients before the procedure and careful evaluation of collateral circulation between the coronary arteries before the procedure are very important. Secondly, we wanted to emphasize that although epicardial collaterals are the last option due to their nature, they are quite valuable in terms of case success.

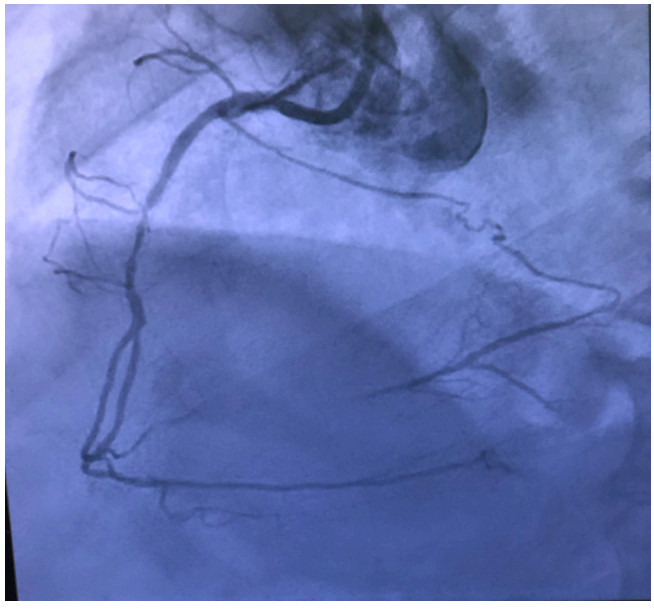


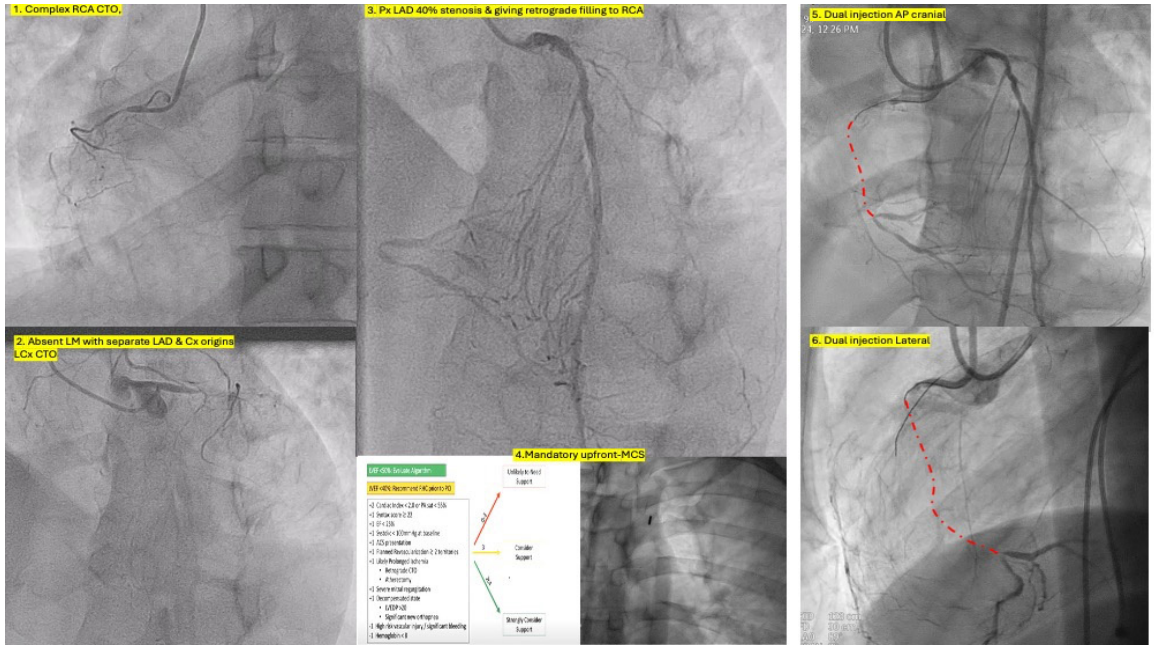
Figure 1. Right coronary angiography show an epicardial collateral originated from conus branch that reachs RCA distal

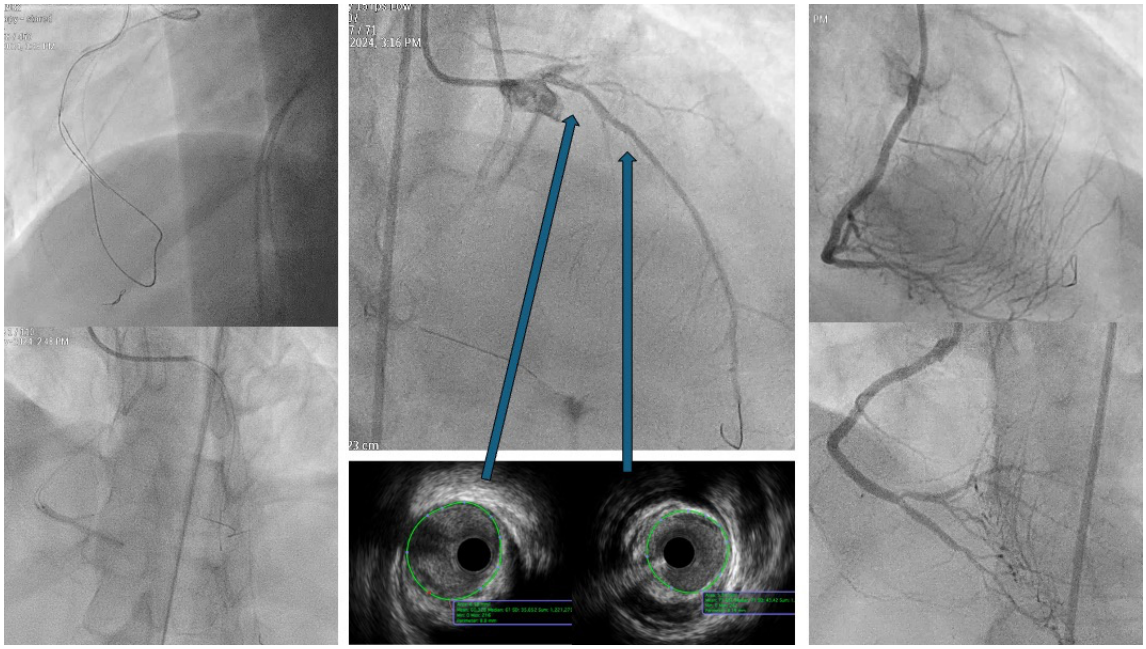
The Very Complex PCI for A Type-2 Myocardial Infarction

Ahmad Samir

Cardiac Center Hail, Saudi Arabia

A 42-y-o male, type-1 diabetes mellitus C/o acute NSTEMI (typical chest pain and highly + and cTn) DKA-shock (80/45 mmHg). Focused echo = ejection fraction 35%, Severe hypokinesis inferior, posterior and akinetic thinned lateral wall. Started insulin infusion, fluids correction, small dose norepinephrine. Transferred to cathlab for CAG. Separate ostia to left circumflex artery [chronic total occlusion (CTO) no ante- or retro flow] and left anterior descending artery (LAD) (which has proximal 40-50% stenosis). Complex right coronary artery (RCA) CTO with retro-filling of posterior descending artery and PL from LAD. No hazy (likely acute) lesions, and it was clear that haemodynamic and metaolic stress led to type-2 myocardial infarction amid the coronary circulation jeopardy. After stabilization (next day) planned for upfront mechanical circulatory support by intra-aortic balloon pump, and complex primary retrgrade PCI to RCA CTO. Guideliner assisted reverse controlled antegrade and retrograde tracking, externalized RG3, predilated the RCA then advanced antegrade wire into the PL branch, then performed intravascular ultrasound (IVUS). The distal bifurcation of the RCA was heavily diseased, so opt for Jailed balloon technique, then completed stenting of the RCA with IVUS guidance and optimization. Also, LAD was assessed by IVUS to ensure non-significant non-vulnerable lesions.





When the Hard Work Pays Off

Ahmad Samir

Cardiac Center Hail, Saudi Arabia

A 73 y-o gentleman, diabetes mellitus, HTN, long history of IHD, significant limitation in his effort tolerance and activity, echo, LVEF 30%, multi-territorial RWMA. CAG = complex multilevel right coronary artery (RCA) chronic total occlusion (CTO), Complex proximal left anterior descending artery (LAD) CTO, coronary interdependence. LAD fills from marginal of RCA, RCA fills from LCx. Pt counselled for CABG, but adamantally refused. First stage > percutaneous coronary intervention (PCI) LAD, planning for second stage for PCI to RCA CTO. Second stage, unfortunately found RCA progressed to aorto-ostial CTO. Completely ambiguous course, very long CTO segment, the retrograde wire hardly reached a marginal branch and could not be advaced into prox RCA, where the knuckle was pushing the retrograde EBU out. Antegrade Carlino to resolve part of prox RCA ambiguity. Finally, could perform Guideliner-assisted reverse controlled antegrade and retrograde tracking in the RCA para-ostial region. Despite the Gaia 3rd have reached aortic lumen, but could torque advance the retrograde MC.

Snared the Gaia, to provide a grip support, then advanced the retrograde guide to aortic lumen, then let-go the Gaia and advanced RG3 in the MC that was snared into the antegrade guide.

The RG3 slipped from the snare, with exhaused microcatheter and kinked (snared) RG3, could not fully push to externalize, so advanced a free antegrade microcatheter and performed Rendez-Vous in the shaft of the antegrage guide. Advanced the antegrade guide over RG3 till mid PDA, then withdrew RG3 and advanced an antegrade workhorse wire. Finished with 2 overlapping drug-eluting stent into a very satisfying result.

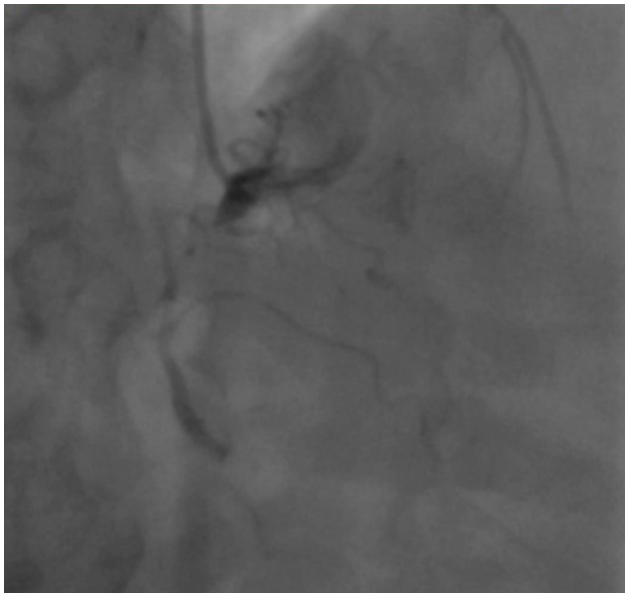


Figure 1. Multilevel RCA CTO, RV marginal fills LAD CTO

RCA: Right coronary artery, CTO: Chronic total occlusion, RV: Right ventricle, LAD: Left anterior descending artery

Figure 2. First procedure, PCI LAD CTO by AWE

PCI: Percutaneous coronary intervention, AWE: Antegrade wire escalation, CTO: Chronic total occlusion, LAD: Left anterior descending artery

Figure 3. Final after PCI LM-LAD by 2 DES

PCI: Percutaneous coronary intervention, LM: Left main coronary artery, LAD: Left anterior descending artery, DES: Drug-eluting stent

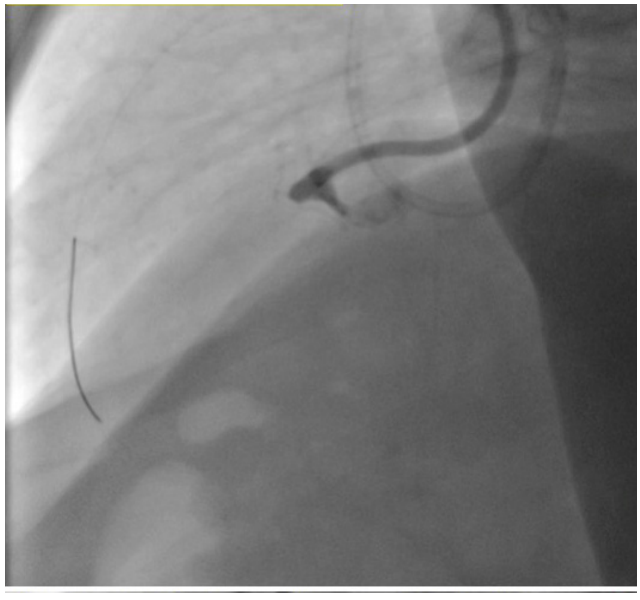


Figure 4. On the 2nd procedure, astonished to find RCA became aorto-ostial CTO

RCA: Right coronary artery, CTO: Chronic total occlusion

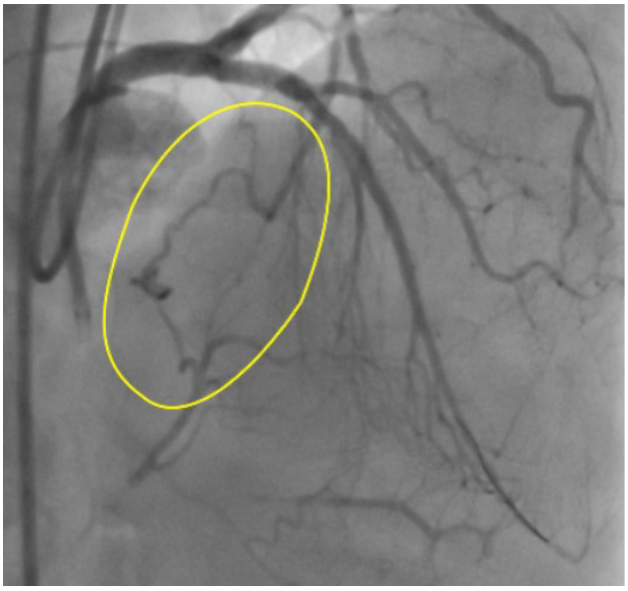


Figure 5. Predominant filling is epicardial LCx
LCx: Left circumflex artery

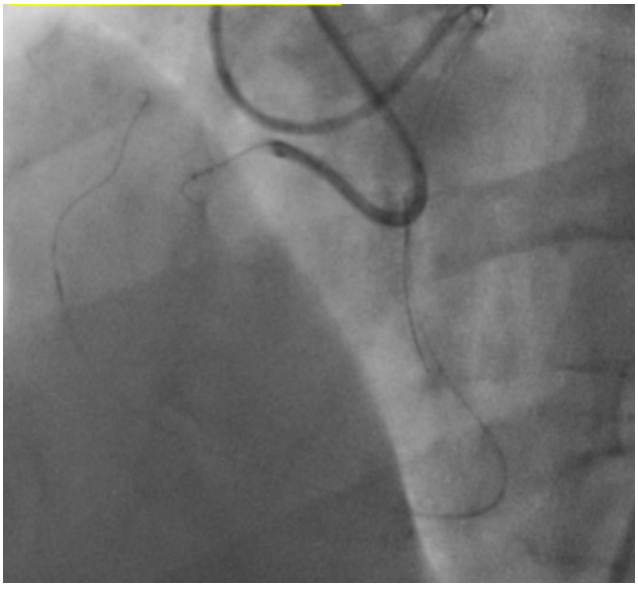


Figure 6. Fortunate to find a septal connection, but it seemed away from the antegrade gear

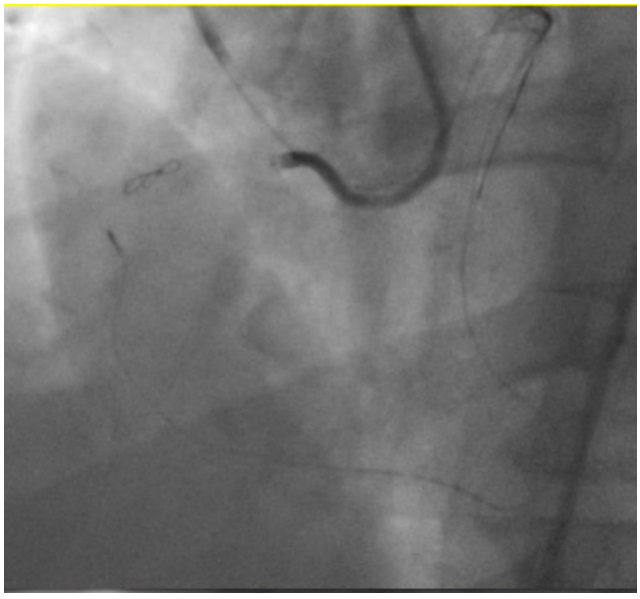


Figure 7. Knuckled retrograde wire to push through ambiguous segment, but knuckle was unpushable, disengaging EBU
EBU: Extra backup (guide catheter type)

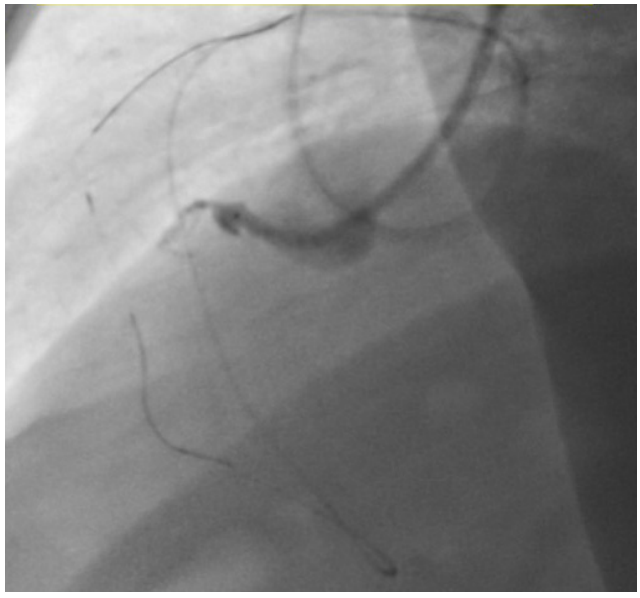


Figure 8. Carlino antegrade to resolve part of ambiguity

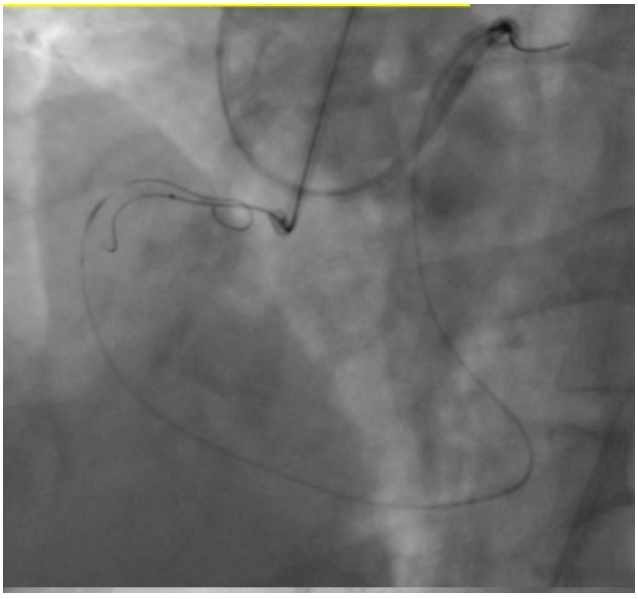


Figure 9. Better advanced antegrade wire, redirected retrograde wire into prox RCA architecture

RCA: Right coronary artery

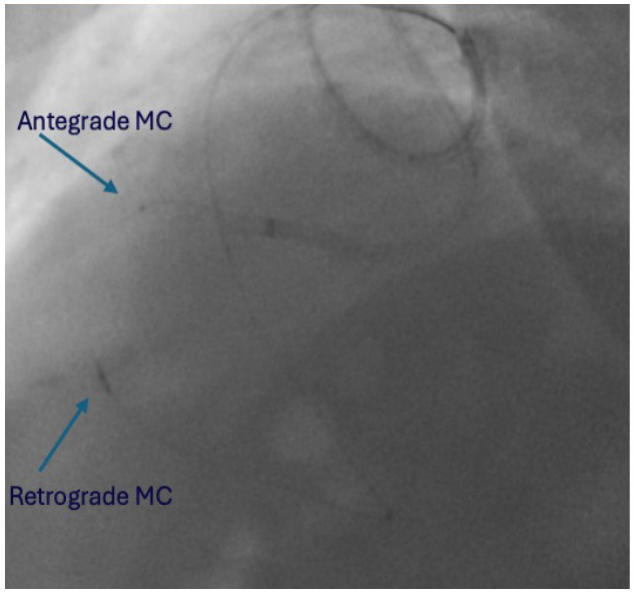


Figure 11. RG3 was kinked, could not fully externalize, Rendez-vous antegrade micro over the RG3

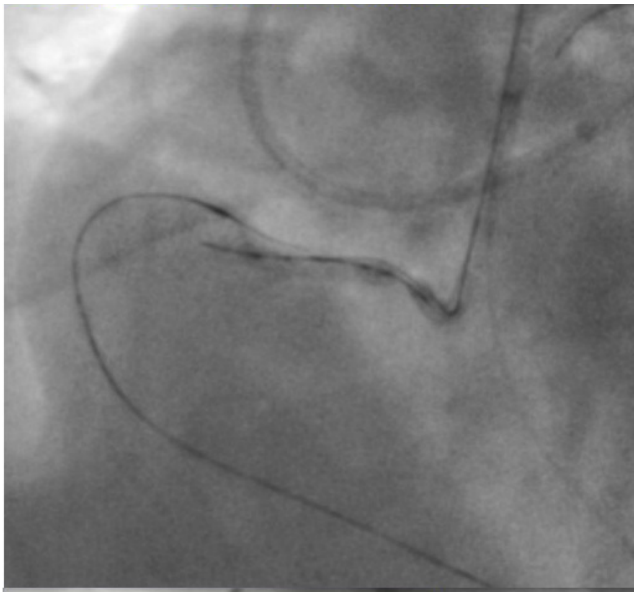


Figure 10. Guideliner R-CART at RCA paraostium

RCA: Right coronary artery, R-CART: Reverse controlled antegrade and retrograde tracking

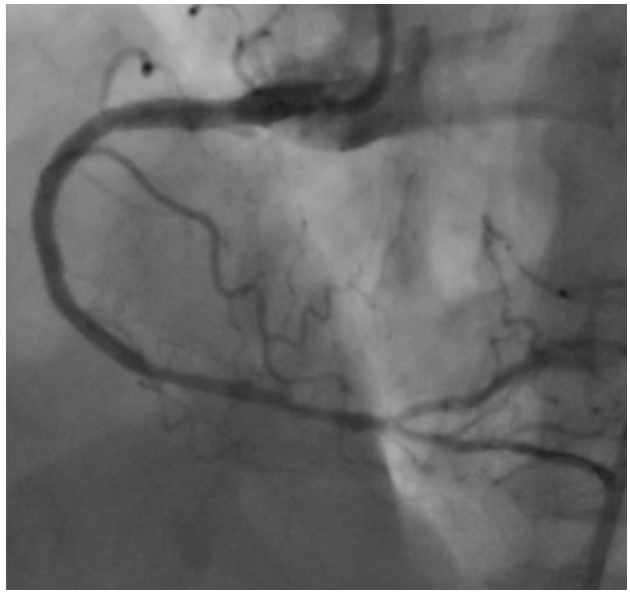


Figure 12. Final after a long challenging PCI

PCI: Percutaneous coronary intervention

Combined Use of DES and DCB in CTO Procedure

Ali Reza Abdi Ardekani

Interventional Cardiologist, Shiraz, Iran

Chronic total occlusion (CTO) lesion are complex in plaque composition, length and also effect on distal vessel beyond occlusion.

One of major concern in CTO lesion is length of stents deployed in coronary arteries.

Due to process of negative remodeling, overestimation of length of lesion is a common source of error and Imaging modality like IVUS can be a good guide for limiting number of stent used in this procedure.

However, progression of lesions beyond CTO segment are common as consequence of loss of linear flow and abnormal shear stress and we can see lesion with moderate to severe stenosis.

Treating these lesions by stent deployment increase's chance of ISR and ST (an the consequences) and let them untreated may complicated procedure by poor distal out flow and chance of stent failure.

In this situation precise and accurate use of DCB could be an option after stenting of CTO main lesion (and dissected part of vessel as result of procedure).

In this manner chance of recovery endothelial function, by avoiding use of metal is higher and this result to better outcome for treated vessel (improved vasoreactivity and flow reserve) and lesion (better outflow, lesser ISR).

I descried some of these cases, which managed by this approach by limiting number and length of stent and good final result by meticulous use of DCB.

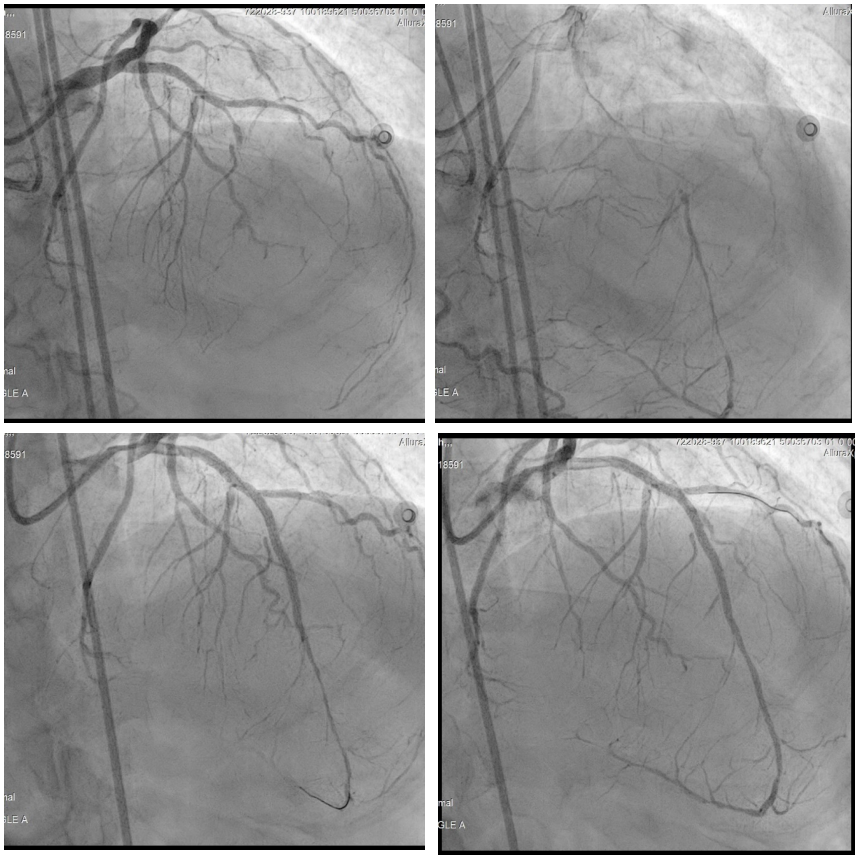


Figure 1. LAD ISR CTO in patient with ESRD, HF, managed with DES for ISR CTO, and DEP for distal lAD with good result and recovery of LV EF (30 to 45 % after 6 months)

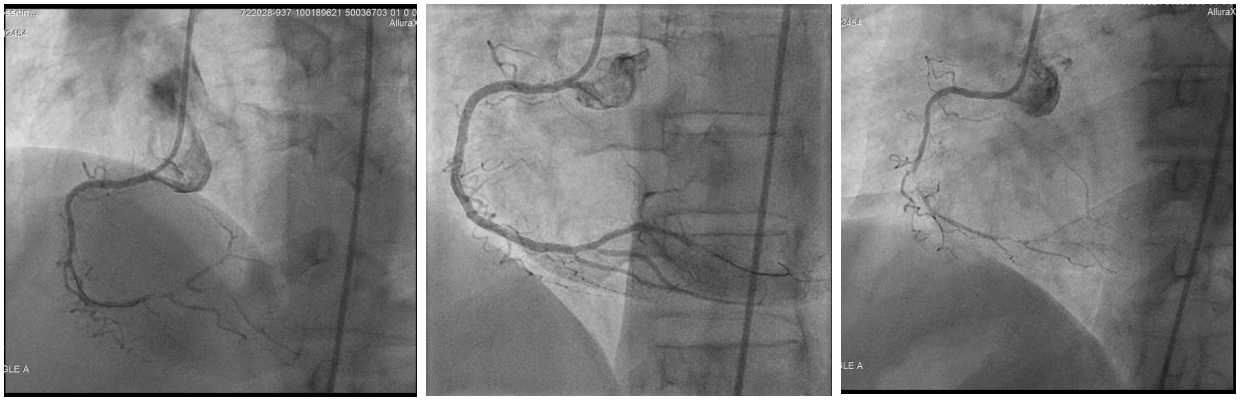


Figure 2. RCA CTO in midpart, after recanalization of RCA, distal RCA and PLB lesions managed by DCB with good result

Missed RCA, PCI on RCA CTO

Ali Reza Abdi Ardekani

Interventional Cardiologist, Shiraz, Iran

This is a 63 y/o man, who referred due to exertional dyspnea for cardiovascular evaluation prior to kidney transplantation.

He had Hx of long-standing DM, HTN, HPL and CAD, with prior left anterior descending (LAD) percutaneous coronary intervention (PCI) (about 11 y/o) and then coronary artery bypass grafting (CABGs) (3 y/o).

Due to ESRD, he undergone regular H/D since 4 y/o.

He described his symptom of DOE and occasional cheat pain did not improved completely after CABGs and his functional capacity was limited due to dyspnea (NYHA: II-III) and easy fatigue.

His echocardiography showed: LV EF:50 with mod PH (SPAP:50).

Due to incomplete recovery and need for high-risk surgery, an MPI requested and showed severe extensive ischemia of inf, inf post, post lat wall (>5 myocardial segments).

With these data, coronary angiography (CAG) was performed and showed:

Occlusion of LAD stents, atresia of LIMA to LAD, Patency of saphenous vein graft (SVG) to D1 and D2 with filling of LAD by SVG to D2 without graft for right coronary artery (RCA) of LCx. RCA had mod to severe proximal lesion and seems occluded after second PDA>.

There was rich collateral from both D1-2 to some PLB branches directed toward RCA (not LCx).

Before any panning, I find prior CAG and the problem solved. RCA was super dominant vessel with large PLBs and missed in prior study due to poor quality imaging and not approached by surgeon (Figure 1-2)! So I decided to do PCI for RCA.

In another session I did bilateral injection of SVG to D2 and RCA and anatomy of RCA clarified with chronic total occlusion (CTO) (J score 3, ambiguous cap, side branch and long lesion) (Figure 3).

Due to proximal ambiguity, antegrade approach failed, so I tried retrograde approach, and I chose SVG to D1 because of more straight course I confirm connection of D1 colateral to distal PLV branch by dual injection of SVG to D1 and D2.

Retrograde wiring was not difficult by microcatheter did not passed, so I picked up retro wire into antegrade guide extension in RCA, then I did tip in, and antegrade microcatheter passed the CTO lesion, predilation, and stenting was done as usual and final result was well (Figure 4).

In F/U his symptoms improved.

Take home message: this case presentation showed how quality of procedure affect, plan and out come of our procedure.

Figure 1. SVG to OM2 angiogram
SVG: Saphenous vein graft, OM2: Obtuse marginal 2

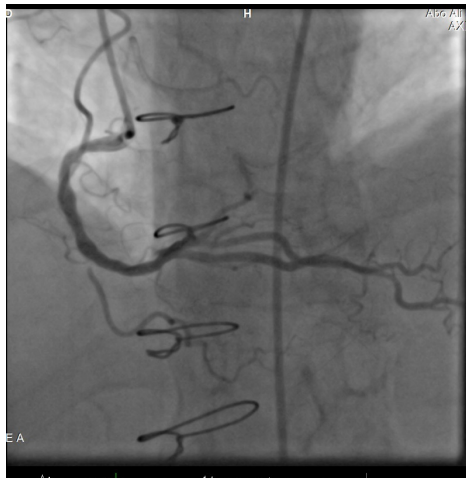


Figure 2. Native RCA with distal occlusion
RCA: Right coronary artery

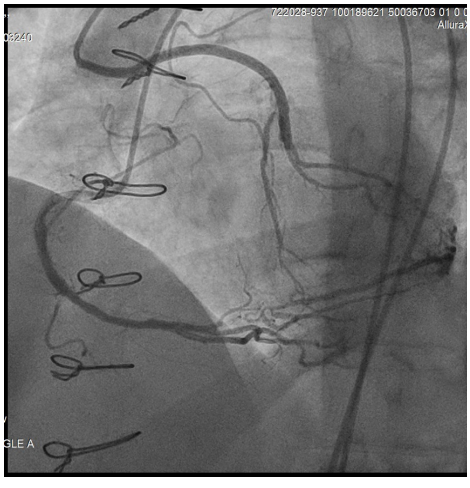


Figure 3. Dual injection of RCA and SVG to OM2
RCA: Right coronary artery, SVG: Saphenous vein graft, OM2: Obtuse marginal 2

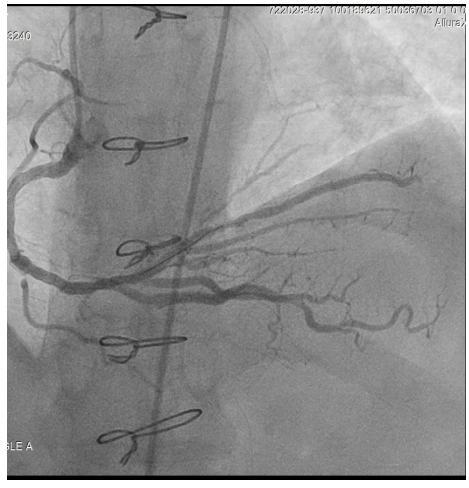


Figure 4. Final result after stenting of proximal lesion and distal CTO
CTO: Chronic total occlusio

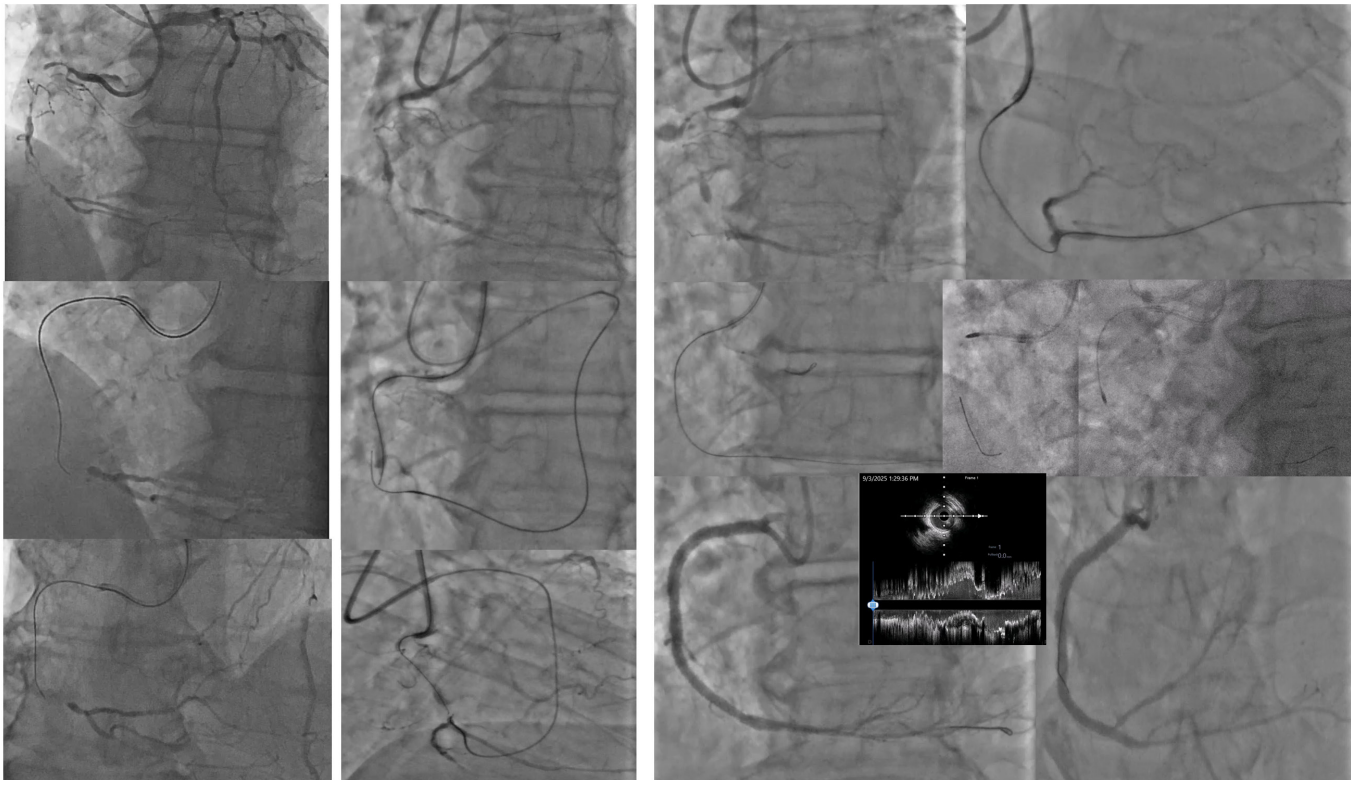
Complex Recanalization of a Calcified RCA CTO Using an Antegrade-Retrograde Approach and Rotational Atherectomy

Staferov A.V., Stolyarov D.D., Kiryushchenkov V.P., Konev A.V., Staferov A.A

Federal Scientific and Clinical Center for Specialized Types of Medical Care and Medical Technologies of the Federal Medical and Biological Agency of Russia, Moscow, Russian Federation

Chronic total occlusion (CTO) remains one of the most complex forms of coronary artery disease. Calcification significantly complicates successful intervention in this cases. Repeated nature of the intervention may also affect the likelihood of successful recanalization.

The presented case demonstrates successful recanalization of an initially simple (J CTO score 1-2) old-(17 years old) occlusion of the distal right coronary artery with moderate calcification of the proximal segment after two unsuccessful attempts. The first antegrade recanalization procedure was unsuccessful, complicated by the development of extravasation due to subintimal passage of the guidewire. The emphasis in the second attempt was on the retrograde approach, but it was not possible to pass the retrograde guidewire into the proximal true lumen, calcification of the proximal segment made modification of the occlusion zone difficult. During the third intervention, the antegrade guidewire was almost immediately passed into the true lumen, apparently due to channel formation during the previous attempt. However, even after successful passage of the guidewire, the calcified proximal lesion made the procedure very complex. The use of the balloon-anchor technique, staged rotational atherectomy with bur escalation allowed for successful stenting under intravascular ultrasound control.



Hybrid CTO Approach with Antegrade and Retrograde Techniques

Behice Hande Şişman

Clinic of Cardiology, Kırklareli Traning and Research Hospital, Kırklareli

A 51-year-old male with a history of inferior ST-segment elevation myocardial infarction, managed with right coronary artery (RCA) stenting in November 2024 and subsequent left anterior descending (LAD) artery stenting in December 2024, was admitted for an elective percutaneous coronary intervention of a chronic total occlusion (CTO) in the circumflex (Cx) artery.

The procedure was initiated via right biradial access using a 7 French CLS 3.5 catheter engaged to left main coronary artery, and a 7 French AL1 catheter to RCA. A safety wire was placed in the RCA and LAD. Elong microcatheter was advanced to the lesion site. Attempts to cross the CTO lesion with a Gaia 3 wire were unsuccessful. A Conquest Pro 12 wire was then used subintimally to re-enter the distal true lumen; however, the microcatheter could not be advanced distally. Balloon angioplasty was performed using a 1.5x20 mm balloon, but no distal flow was observed. Parallel wiring with Gaia 3 wire was attempted, which again resulted in subintmal tracking into the distal lumen.

The retrograde approach was initiated via the RCA using a Finecross microcatheter. Attempts to cross collateral channels with an Anyreach guidewire failed. Using a Sion Black wire, an epicardial collateral was successfully crossed, allowing access to the distal Cx, where the microcatheter was advanced. Retrograde attempts to cross the lesion with a Conquest Pro 9 wire were unsuccessful. Another epicardial collateral branch was then targeted. TIP injections performed via the D3 branch failed to provide a suitable collateral channel; attempts to cross with Anyreach and Sion Black wires were unsuccessful.

Returning to the RCA retrograde route, the lesion was finally crossed with a Gaia 3 wire. The microcatheter was advanced into the CLS 3 catheter. Antegrade TIP-in was achieved by advancing a Sion Black wire into the Finecross microcatheter. Balloon angioplasty was performed with 2.0x20 mm and 2.5x20 mm balloons. Total occlusion developed at the ostium of a well-developed obtuse marginal 2 (OM2) branch. The OM2 was wired with a Finecross microcatheter and Gaia 3 wire. Balloon angioplasty was performed on both the Cx (2.5x20 mm) and OM2 (2.0x20 mm) arteries, followed by kissing balloon inflation at 16 atm. A 2.5x25 mm PROMUS stent was deployed and post-dilatatated with a 3.0x15 mm non-compliant balloon at 12-20 atm, achieving optimal stent expansion and full vessel patency.

Overcoming Dual CTO Segments in the Anomalous RCA Using Stepwise Wire Escalation and Anchor Techniques

Behice Hande Şişman

Clinic of Cardiology, Kırklareli Traning and Research Hospital, Kırklareli

A 53-year-old male patient with a history of hypertension, diabetes mellitus, and hyperlipidemia presented with Canadian Cardiovascular Society Class II angina. His medical history included ostial left anterior descending (LAD) stenting in July 2025, with a prior failed attempt at right coronary artery (RCA) chronic total occlusion (CTO) intervention. The reason of failure was poor guide catheter engagament to RCA ostium and unsuccesfull attempts of retrograde crossing to RCA from LAD.

The intervention was initiated via right femoral access with a 7 French sheath. Retrograde filling was assessed from the left system; however, attempts to engage the RCA ostium using amplatz left 1 (AL1), coronary left support 4, and Judkins right 4 catheters were unsuccessful. The approach was switched to the left radial artery using a 7 French sheath. The RCA ostium was successfully cannulated with an AL1 catheter.

A choice wire was used to wire the right ventricular branch, which was anchored with a 2.0x15 mm balloon. A Finecross microcatheter was advanced to the lesion site. Tip injections were performed to delineate the anatomy. Multiple attempts to cross the CTO lesion with Conquest Pro 9, Gaia 3, and Pilot 200 wires were unsuccessful. The microcatheter was redirected into a side branch with a Gladiator MG wire but could not be advanced distally. Balloon angioplasty attempts using 1.0x10 mm and 1.25x20 mm balloons failed to cross the CTO segment. The microcatheter was exchanged for an Elong 2.6, which was successfully advanced distally. Balloon angioplasty was then performed through the side branch with 1.0x10 mm, 1.5x15 mm, and 3.0x15 mm balloons. A separate distal CTO segment was identified and crossed using a Gaia 3 wire, although the microcatheter could not be advanced distally. Balloon dilatation was performed with 1.0x10 mm and 1.5x15 mm balloons. The wire was then exchanged for a choice wire, and further balloon angioplasty was conducted with a 2.5x30 mm balloon.

Two overlapping SUPRAFLEX drug-eluting stents (2.75x48 mm and 2.75x24 mm) were implanted in the RCA CTO segment, followed by post-dilatation with a 3.0x15 mm non-compliant balloon at 20 atm. The procedure concluded with restoration of TIMI 3 flow and no residual stenosis.

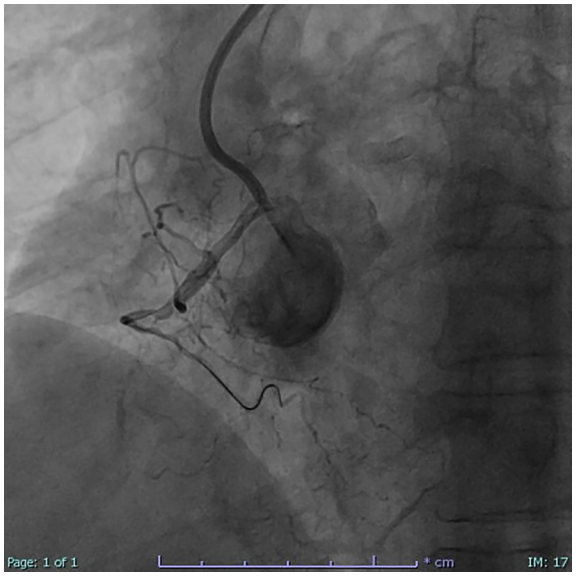


Figure 1. RCA CTO antegrade flow

RCA: Right coronary artery, CTO: Chronic total occlusion

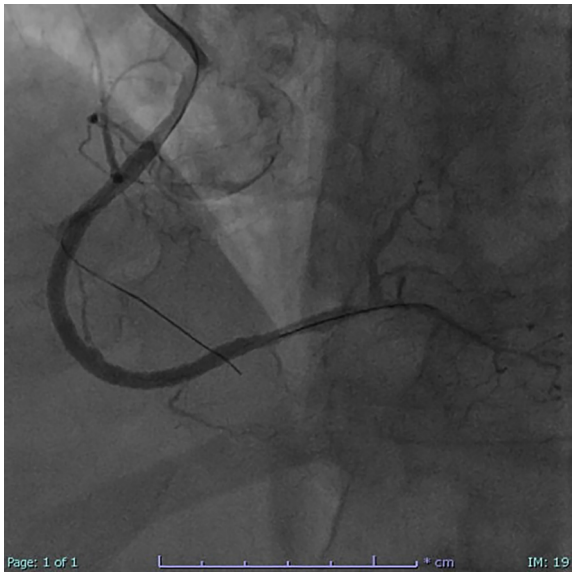


Figure 2. Final result

Case Report: Successful LAD CTO Recanalization via Hidden Conus Artery Collaterals Patient

Cuma Süleymanoğlu

Clinic of Cardiology, Osmaniye State Hospital, Osmaniye

Aim: A 55-year-old male, ex-smoker, with a medical history significant for hypertension and type 2 diabetes mellitus, was referred for complex coronary intervention following a non-diagnostic angiography performed at another center.s

Case Report: The patient initially underwent coronary angiography due to reversible ischemia detected on myocardial perfusion scintigraphy. Coronary angiography revealed chronic total occlusions (CTOs) of both the left anterior descending (LAD) and right coronary artery (RCA). There was no angiographic filling of the distal LAD (Rentrop 0) and only mild collateral filling of the distal RCA (Rentrop 1), with no remarkable interventional connections visualized. The case was initially deemed inoperable due to the lack of identifiable distal LAD target vessel and absence of suitable collaterals. The patient was referred to our center for consideration of an interventional approach. A bifemoral access strategy was employed using a 3.5 EBU guide catheter for the left coronary system and a JR guide for the right system. While attempting to engage the RCA, we identified a previously unrecognized conus artery giving rise to multiple epicardial collaterals supplying the mid-segment of the LAD.

Recognizing the potential utility of these collaterals, we adopted a primary retrograde strategy, with the aim of performing a Reverse Controlled Antegrade and Retrograde Tracking (Reverse CART) technique.

- A 1.8F Finecross MG microcatheter (TERUMO) was advanced retrogradely via the conus collaterals.
- Initial wiring was performed with a SUOH 03 guidewire (ASAHI 0.014"), which was later exchanged for a Sion Black (ASAHI 0.014") to successfully reach the distal cap of the LAD CTO.
- Simultaneously, antegrade wiring was performed using a Gaia Second (ASAHI 0.014") guidewire.
- Reverse CART was facilitated using a GuideLiner-assisted technique within the CTO body. Following balloon dilatation, the Gaia Second was able to cross retrogradely through the CTO segment and enter the GuideLiner, achieving successful connection with the antegrade guide catheter.
- A rendezvous technique was used to externalize and switch to an antegrade approach for further lesion preparation.
- After serial predilatations, the lesion was stented, achieving successful TIMI 3 flow in the LAD. This case underscores the importance of meticulous angiographic analysis in complex CTO interventions. Collateral channels may originate from atypical or overlooked sources, such as the conus artery in this patient, and may not be immediately evident on standard projections. The conus branch, often dismissed or inadequately visualized, can provide critical collateral support, as demonstrated here.

Moreover, pre-procedural coronary computed tomography (CT) angiography can be invaluable in delineating ambiguous coronary anatomy and planning the optimal interventional strategy, especially in cases where angiographic findings are limited or misleading. In select cases, CT imaging may be pivotal in transforming an "inoperable" case into a feasible and successful intervention.

Conclusion: This case highlights the necessity of a flexible, anatomy-driven approach in CTO interventions. Recognition of unconventional collateral pathways, strategic use of advanced techniques such as Reverse CART, and comprehensive pre-procedural imaging are key components for success in complex CTO scenarios. A careful and detailed angiographic assessment, complemented when needed by CT coronary angiography, can often reveal opportunities that fundamentally change the interventional strategy and patient outcome.

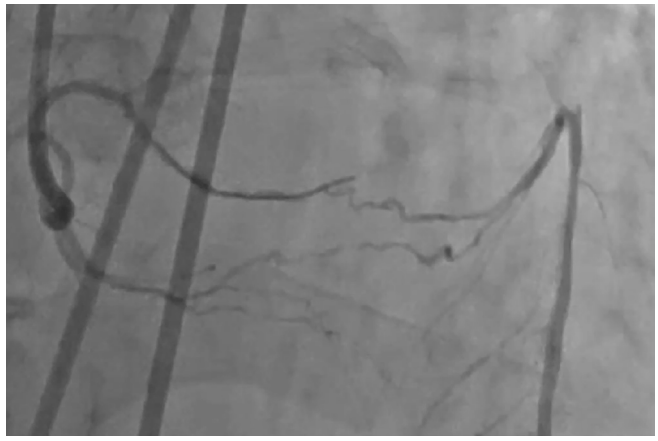


Figure 1. Crossing the collateral donor artery

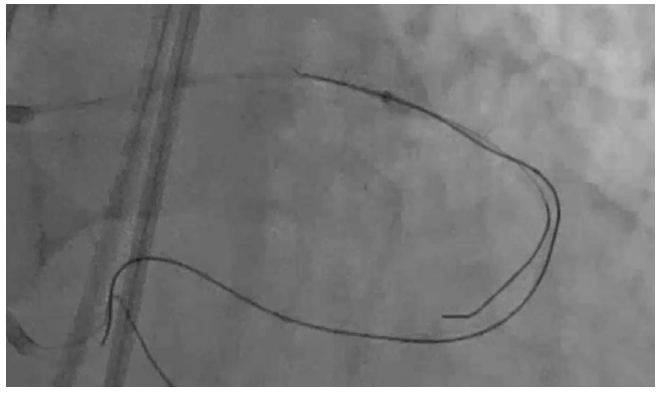


Figure 2. Guide extension assisted reverse cart at the CTO segment
CTO: Chronic total occlusion

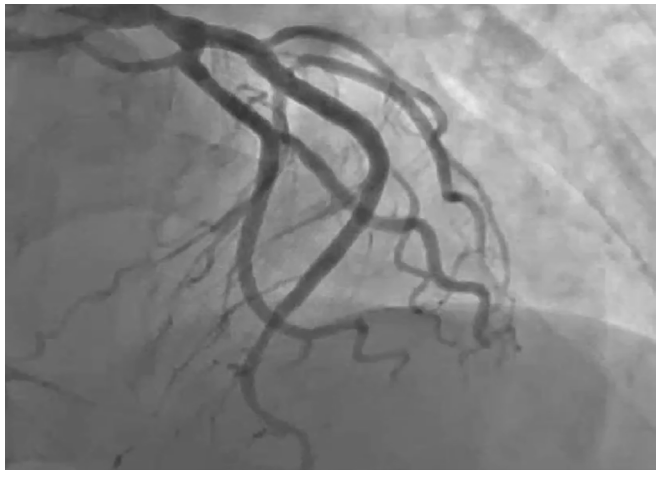


Figure 3. Final result

Successful Retrograde Recanalization of RCA CTO Using Reverse CART Technique: A Case Report

Enes Alıç, Mehdi Onaç, Hakan Uçar

İstanbul Aydın University, VM Medical Park Florya Hastanesi, İstanbul

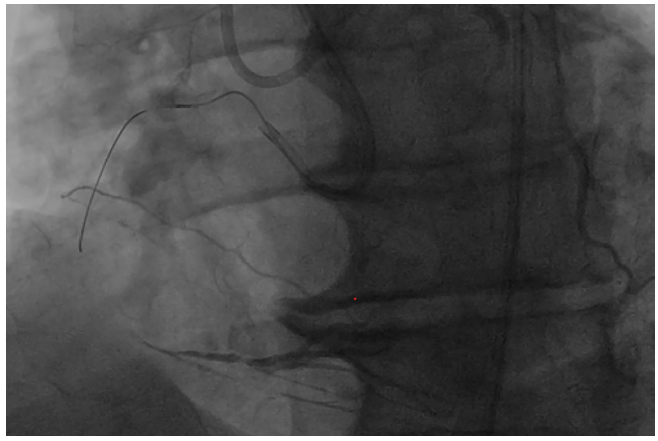
Chronic total occlusions (CTOs) represent one of the most complex lesion subsets in interventional cardiology, frequently associated with lower procedural success rates compared to non-occlusive lesions. A 45-year-old male with multiple cardiovascular risk factors, including hypertension, diabetes, smoking, and dyslipidemia, presented with stable angina. Coronary angiography revealed a CTO of the right coronary artery (RCA). Dual angiography demonstrated the presence of well-developed septal collaterals, suggesting a potential pathway for retrograde intervention.

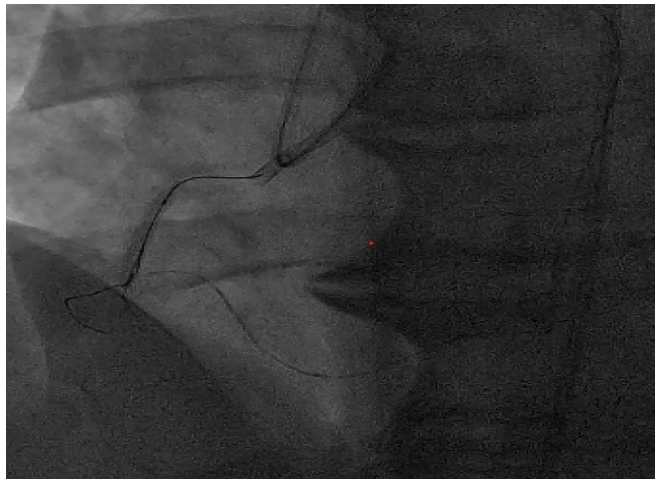
Initial antegrade attempts were made using high-penetration guidewires, including Gaia III, Conquest, and Fielder wires. Despite multiple strategies, successful crossing could not be achieved. Given the complexity and length of the lesion, the decision was made to adopt a retrograde strategy. Septal collaterals were successfully crossed using a Sion Black wire, followed by sequential predilatation with 1.0 mm and 1.2 mm balloons to facilitate the passage of equipment. Subsequently, PT2 and Whisper wires were advanced toward the CTO cap from the retrograde route.

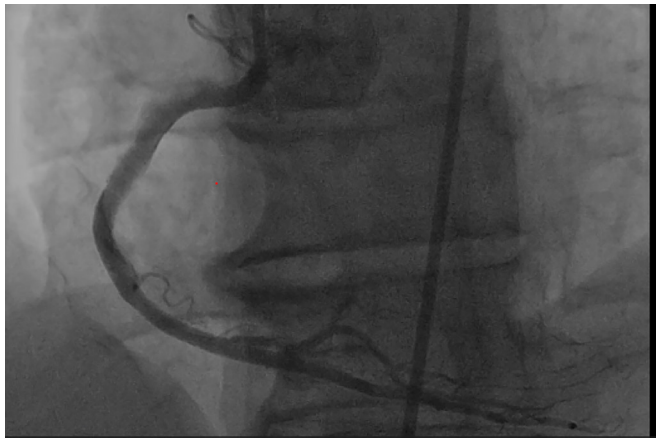
The Reverse Controlled Antegrade and Retrograde Subintimal Tracking (Reverse CART) technique was employed, involving the inflation of a 2.5 mm balloon to create a common subintimal space for both antegrade and retrograde wires. This maneuver enabled the successful connection of the two channels and facilitated retrograde wire externalization. Following successful externalization, percutaneous coronary intervention (PCI) was performed with sequential implantation of drug-eluting stents (DES): a 2.75×48 mm DES, a 3.0×28 mm DES, and a 4.0×35 mm DES. Final angiographic assessment demonstrated restoration of TIMI 3 flow and complete vessel recanalization without periprocedural complications.

This case highlights several important learning points. First, antegrade failure in complex CTOs should prompt early consideration of retrograde strategies, particularly when suitable septal collaterals are available. Second, the role of septal channels is pivotal, as they often provide the safest and most effective retrograde pathway. Third, Reverse CART remains a cornerstone technique for achieving wire crossing in complex CTO PCI. Reported success rates for CTO PCI in high-volume centers range between 85-90%, largely attributable to the use of advanced retrograde techniques.

In conclusion, this case illustrates the clinical value of retrograde RCA CTO PCI using septal collaterals and Reverse CART after failed antegrade attempts, resulting in an excellent procedural outcome and complete vessel revascularization.







Successful Retrograde Recanalization of Near-Ostial RCA CTO Using Reverse CART Technique

Enes Alıç, Mehdi Onaç, Hakan Uçar

İstanbul Aydın University, VM Medical Park Florya Hastanesi, İstanbul

Chronic total occlusions (CTOs) account for nearly 15-20% of all coronary lesions and continue to represent one of the most technically demanding subsets in interventional cardiology. Among these, near-ostial CTOs are especially challenging because of proximal cap ambiguity, difficulties in catheter engagement, and the lack of a clear entry point. The use of retrograde strategies and advanced crossing techniques such as reverse controlled antegrade and retrograde subintimal tracking (reverse CART) has significantly improved procedural success in such scenarios.

We present the case of a 70-year-old male patient with a history of left anterior descending stenting who presented with stable angina. His cardiovascular risk profile included hypertension, diabetes mellitus, and smoking. Coronary angiography revealed a near-ostial CTO of the right coronary artery (RCA). Antegrade attempts using Gaia II, Gaia III, and Conquest Pro guidewires were unsuccessful, and the decision was made to switch to a retrograde approach.

Septal collaterals were selected as the retrograde pathway and were successfully crossed using Sion Black and floppy wires. However, initial microcatheter advancement was unsuccessful. Sequential predilatation with 1.0 mm and 1.2 mm balloons was performed, which facilitated successful advancement of a Caravel microcatheter. Subsequently, CTO entry was achieved using an Ultimate Bros 3 wire.

The Reverse CART technique was then employed. Balloon dilatation with 2.5×12 mm and 3.0×15 mm balloons enabled creation of a common subintimal space. The retrograde wire was advanced into the aorta, where successful snaring was performed. An RG3 wire was then externalized, establishing through-and-through access.

Definitive revascularization of the RCA was achieved, with restoration of TIMI 3 flow and complete vessel opening. The procedure was completed without complications.

This case underscores several important clinical messages. First, in the presence of near-ostial CTOs, antegrade strategies frequently fail due to proximal cap ambiguity, making early transition to a retrograde approach crucial. Second, the careful use of septal collaterals and adjunctive balloon dilatation can overcome difficulties in microcatheter advancement. Third, the Reverse CART technique remains a cornerstone for facilitating successful wire crossing and externalization in complex CTO percutaneous coronary intervention.

In conclusion, this case demonstrates that near-ostial RCA CTOs, traditionally considered among the most challenging lesions, can be safely and effectively recanalized using a retrograde strategy with Reverse CART, resulting in excellent angiographic outcomes.

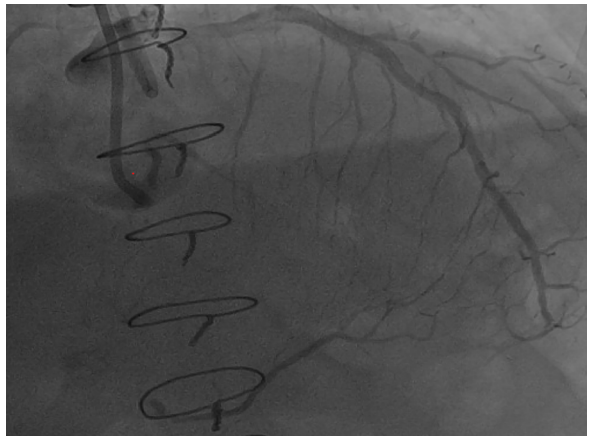


Figure 1. Visualization of the RCA CTO lesion via retrograde septal collaterals
CTO: Chronic total occlusions, RCA: Right coronary artery

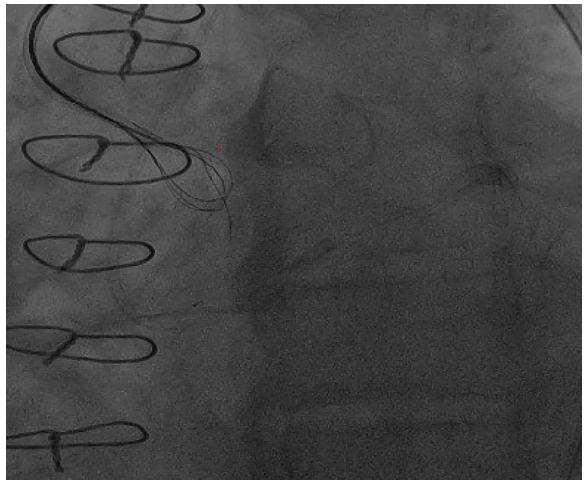


Figure 2. Capture of the guidewire with a snare after its entry into the aorta following the reverse CART technique
CART: Controlled antegrade and retrograde subintimal tracking

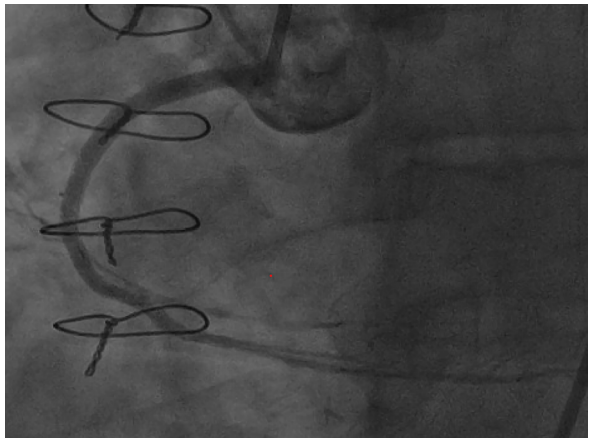


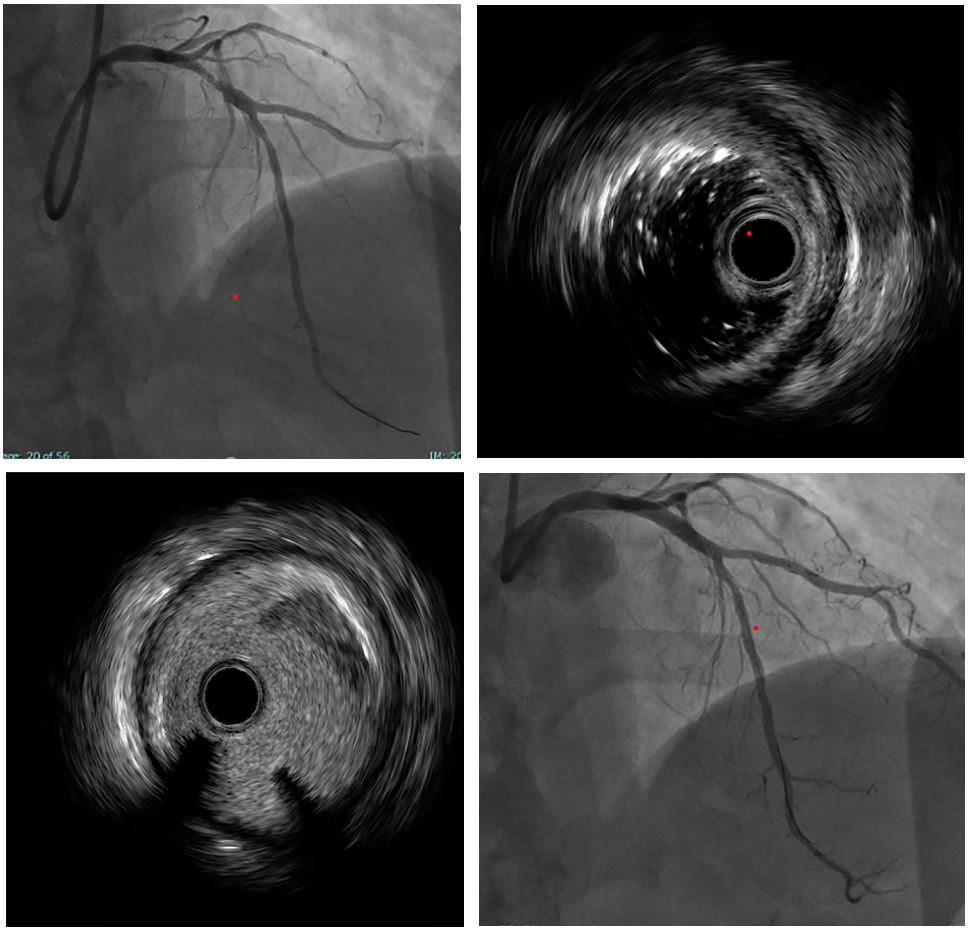
Figure 3. Final angiographic result demonstrating complete recanalization of the RCA
RCA: Right coronary artery

Intracoronary Bubble-induced No-reflow Documented by Pre-stent IVUS

Enes Alıç, Murat Sünbül, Mustafa Kürşat Tigen

İstinye University Faculty of Medicine, Liv Hospital Topkapı, İstanbul

We describe a rare and intriguing case of acute no-reflow phenomenon triggered during pre-stent intravascular ultrasound (IVUS) pullback in a patient with critical proximal artery (LAD) stenosis. No-reflow is usually associated with microvascular obstruction, distal embolization, or reperfusion injury; however, in this case, it was induced by an inadvertent intracoronary bubble injection, highlighting an unusual but important mechanism. A 55-year-old hypertensive male presented with stable angina. Coronary angiography demonstrated a severe stenosis in the proximal LAD. Following balloon predilatation, pre-stent IVUS was performed to determine vessel size and optimize stent selection. During IVUS pullback, a bubble flush was inadvertently administered, leading to an abrupt loss of distal flow signals on IVUS. Simultaneously, angiography confirmed a TIMI flow reduction from grade 3 to grade 1. The patient developed transient chest discomfort accompanied by ST-segment changes on ECG, confirming the hemodynamic and electrical impact of the event. Prompt management was initiated with high-flow oxygen and intracoronary adenosine. This resulted in rapid restoration of coronary flow to TIMI grade 3. Once hemodynamic stability was re-established, a drug-eluting stent was implanted in the proximal LAD, followed by post-dilatation to ensure optimal expansion. Post-stent IVUS confirmed appropriate stent expansion and complete apposition without residual stenosis or malapposition. Final angiography demonstrated TIMI 3 flow and no residual complications. The patient remained stable and experienced no further adverse events during hospitalization. This case provides several important clinical insights. First, bubble-induced no-reflow is an uncommon but significant complication that may occur even in the absence of typical risk factors such as thrombus or calcific burden. Second, IVUS played a pivotal diagnostic role, uniquely capturing the abrupt loss of distal flow signals in real time and correlating with angiographic findings. Finally, timely recognition and rapid pharmacological intervention are critical to restoring flow and preventing adverse outcomes. In conclusion, this case illustrates the potential for bubble injection to trigger acute no-reflow, underscores the diagnostic value of IVUS in detecting this phenomenon, and highlights the importance of vigilant monitoring and prompt management in complex coronary interventions.



One CTO Lesion, Two Retro Option

Fatih Kahraman[1], Ökkeş Utku[1], Mehmet Hakan Uzun[2], Recep Gülmez[2]

[1]*Department of Cardiology, Kütahya University Faculty of Medicine, Kütahya*

[2]*Clinic of Cardiology, Kütahya City Hospital, Kütahya*

A 71 year-old male admitted to ER with squeezing chest pain. Electrocardiogram shows atrial fibrillation with no obvious ST elevation. He had two vessel coronary artery bypass graft surgery history (LIMA-LAD and aort-saphenous vein-Obtuse Marginal artery [OM]). He admitted to coronary care unit with the diagnosis of NSTEMI. He coronary angiography (CAG) showed LIMA patent, Cx proximal disease, mid CTO and epicardial collateral to Cx and vein graft to OM, right coronary artery mildly diseased and saphenous vein to OM has osteal disease, mid long lesion (60-70%), distal 95% stenosis, and lesion in anastomosis (Figure 1). Cardiology team discussion resulted with native Cx CTO percutaneous coronary intervention (PCI) plan. Right radial 7F EBU3.5 to left main coronary artery and left femoral 7F JR4 catheters were engaged to saphenous vein to OM graft. First step was epicardial retrograde approach to distal Cx, second step to antegrade OM wiring and third step -if second step does not work, retrograde approach form vein graft. Epicardial collateral was crossed with Sion Black and Corsair Pro XS, the lesion was crossed with Pilot 150 and Reverse CART was done at the OM1 level. Dual lumen MC was used to pass into OM but Pilot 50 progressed into subintimal space. The OM-Cx connection was passed retrogradely with Pilot 50 and Corsair Pro XS. Aftet several predilatations, 2.75x38 mm Boston Promus stent was implanted from Cx to OM. 3.5 NC balloon was used for POT and Cx was left with dissection with distal TIMI 2 flow. One month later the patient was taken to the cath lab for control CAG and Cx PCI. Both were wired and predilatitons were done. 2.5x16 mm Boston Promus stent was implanted with staged culotte technique. Final image showed excellent distal flow in both branches (Figure 2).

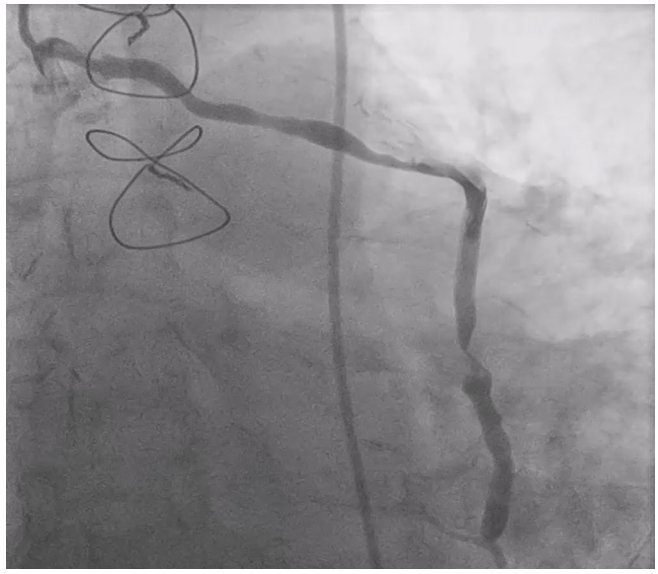


Figure 1. Saphenous vein to OM: Osteal disease, mid long lesion (60-70%), distal 95% stenosis, lesion in anastomosis

OM: Obtuse Marginal artery

Figure 2. Final image of Cx and OM after control CAG and staged culotte PCI

OM: Obtuse Marginal artery, CAG: coronary angiography, PCI: percutaneous coronary intervention

Retrograde PCI for LAD CTO with Coil Embolization

Haşim Tüner[1,2], Ömer Göktekin[2]

[1]*Department of Cardiology, İstanbul Arel University Faculty of Medicine, İstanbul*

[2]*Clinic of Cardiology, Memorial Bahçelievler Hospital, İstanbul*

A 68-year-old male with exertional chest pain was admitted for percutaneous treatment of a left anterior descending artery (LAD) chronic total occlusion (CTO) with in-stent restenosis (ISR). Previous angiography also showed an 80% mid right coronary artery (RCA) stenosis, and coronary artery bypass grafting had been recommended but declined. Echocardiography revealed a left ventricular ejection fraction of 45% with apical-septal hypokinesia.

Initial antegrade attempts with a Gaia 2nd wire via Finecross microcatheter failed. A retrograde strategy through the left circumflex artery (LCx) was pursued. Epicardial wiring with Sion Black was unsuccessful, but septal collaterals were successfully crossed with microcatheter support. Balloon anchoring with a 2.0×10 mm balloon in the LCx atrial branch allowed the Gaia 2nd wire to cross the CTO retrogradely. Tip-In technique was performed using a second microcatheter. Lesion preparation included sequential non-compliant balloons (2.0×30 mm, 3.0×30 mm, 3.5×20 mm, 4.0×12 mm), followed by three overlapping drug-coated balloons (DCB) (3.0×40 mm and two 3.5×40 mm). Full lesion expansion was achieved.

During the procedure, coronary perforation developed at the balloon anchoring branch (Figure 1). Prolonged balloon tamponade failed to control the leak. Coil embolization with two 2×4 mm EV3 coils was performed, successfully sealing the perforation (Figure 2). Protamine 5000 U was administered. Post-procedural echocardiography revealed mild pericardial effusion (10 mm) without progression. The patient remained hemodynamically stable on low-dose norepinephrine, was discharged in good condition, and a staged percutaneous coronary intervention (PCI) of the RCA was planned.

CTO interventions remain among the most complex procedures in interventional cardiology, particularly in cases with prior stenting and ambiguous proximal caps. This case illustrates the role of retrograde strategies and the Tip-In technique for successful wire crossing when antegrade attempts fail. DCB-only treatment was chosen due to ISR, which allowed optimal lesion expansion following adequate preparation.

One of the most feared CTO PCI complications is coronary perforation. In this case, perforation occurred at the anchor balloon site. This emphasizes the importance of carefully selecting the anchoring branch, as small or fragile vessels are prone to rupture. Our anchor balloon was 2.0×10 mm, highlighting the need for thorough angiographic assessment before and after anchoring maneuvers. When balloon tamponade proved insufficient, coil embolization provided definitive sealing. Prompt recognition and immediate access to bailout options such as protamine reversal, hemodynamic support, and coil embolization can be life-saving.

In conclusion, retrograde CTO PCI with Tip-In technique and DCB-only treatment can provide effective revascularization in complex LAD CTO with ISR. However, operators must be prepared for complications such as perforation. This case demonstrates that careful anchor balloon selection and immediate bailout strategies, including coil embolization, are essential for safe and successful outcomes.

Keywords: Chronic total occlusion, percutaneous coronary intervention, retrograde approach, Tip-In technique, drug-coated balloon, coronary perforation, coil embolization, anchor balloon, in-stent restenosis

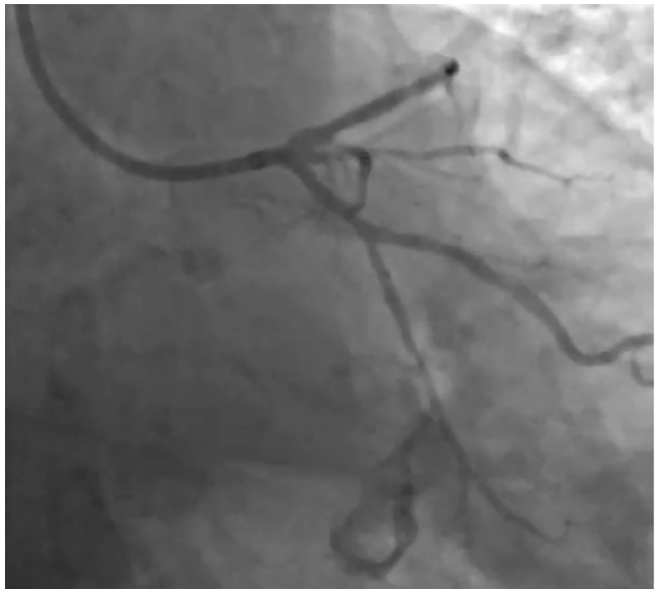


Figure 1. Coronary perforation developed at the balloon anchoring branch

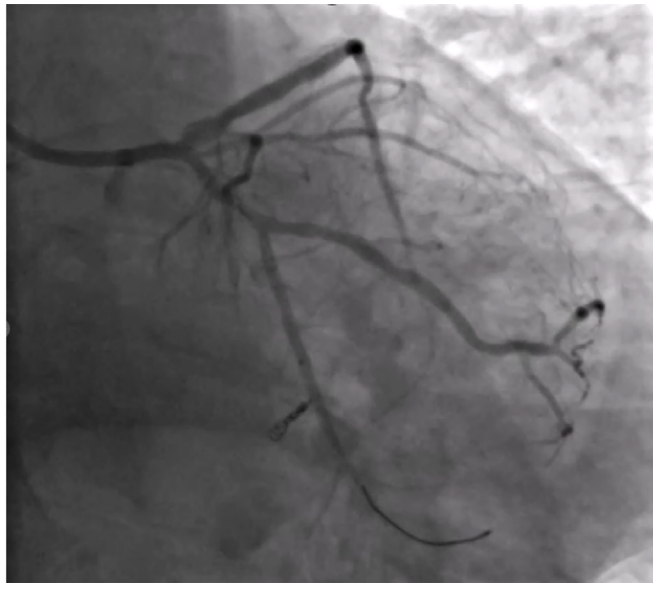


Figure 2. EV3 coils was performed, successfully sealing the perforation

LAD CTO Retrograde Intervention: Case Report

Kenan Toprak

Department of Cardiology, Harran University Faculty of Medicine, Şanlıurfa

We present a case of chronic total occlusion (CTO) of the left anterior descending (LAD) artery managed successfully through a retrograde percutaneous coronary intervention. The patient had previously declined coronary artery bypass grafting and had undergone prior interventions targeting LAD and right coronary artery CTOs. Myocardial perfusion scintigraphy demonstrated more than 10% ischemia within the LAD territory, thereby providing a strong indication for revascularization.

Coronary angiography revealed a pre-existing stent extending from the LAD into the diagonal branch, terminating at the mid-segment of the antegrade LAD stump (Figure 1). The proximal reference diameter of the LAD was not clearly defined, rendering the antegrade approach less favorable. Consequently, a retrograde strategy was selected. Retrograde access was achieved through the diagonal artery via an epicardial collateral channel into the distal LAD. An APT microcatheter and Sion Blue guidewire were employed to navigate the collateral pathway.

Upon entry into the distal LAD, a Conquest Pro 12 guidewire was advanced into the true lumen. This was subsequently exchanged for a 300 cm V-14 guidewire, which was externalized with the assistance of a snare device. Following successful wire externalization, antegrade intervention was initiated. The CTO segment was sequentially predilated with small-diameter balloons (1.25-1.5 mm; Sapphire Pro, OrbusNeich). A Finecross microcatheter was positioned antegradely, and a Runthrough NS floppy guidewire was advanced to facilitate further device delivery and lesion preparation.

The procedure culminated in successful revascularization of the LAD CTO, with restoration of optimal antegrade coronary flow (Figure 2). No procedural complications occurred.

This case illustrates the pivotal role of retrograde techniques in the management of complex coronary CTOs, particularly when anatomical factors or prior stent placement limit antegrade options. The case also underscores the importance of careful pre-procedural planning, appropriate device selection, and meticulous stepwise execution. Retrograde CTO intervention represents a safe and effective alternative to surgical revascularization in selected patients and remains an essential component of the interventional cardiologist's armamentarium.

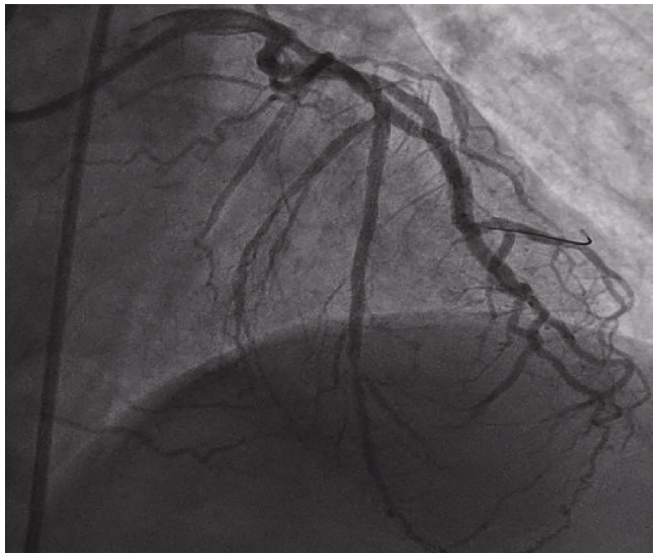


Figure 1. Lad mid segment CTO
CTO: Chronic total occlusion

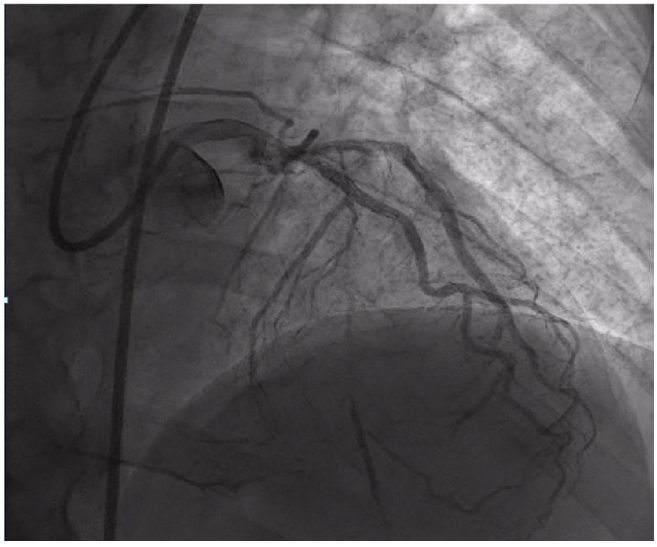


Figure 2. Successful restoration of TIMI 3 flow in the LAD CTO segment.
CTO: Chronic total occlusion, LAD: Left anterior descending

Contrast Leads the Way: A Novel Approach to an Old Adversary

Komal Zahid

Rawalpindi Institute of Cardiology, Rawalpindi, Pakistan

Aim: Percutaneous coronary intervention (PCI) of chronic total occlusion (CTO) can be a technically challenging procedure with comparatively lower success and higher complication rates. With the prevalence of symptomatic CTO being on the rise, techniques of opening CTO are always evolving. While intraplaque contrast injections have a diagnostic role during PCI of CTO helping define vessel anatomy and facilitating wire delivery, we present a case depicting a novel technique called hydrodynamic contrast recanalization whereby hydraulic forces generated by small, gentle intraplaque contrast injections play a safe and cost affective therapeutic role in recanalization of CTO.

Case Report: A diabetic, 60 year old gentleman presented to us with angina Canadian Cardiovascular Society II despite optimal medical therapy including three anti-anginal medications on maximal doses. His echocardiogram revealed normal left ventricular ejection fraction. Coronary angiogram revealed chronic total occlusion of the left circumflex artery with intermediate Japanese Chronic Total Occlusion score of 1. After a heart team discussion, it was decided to go for CTO recanalization via hydrodynamic contrast recanalization due to suitable anatomy. Via right radial approach, we advanced a teleport microcatheter over a workhorse samurai guidewire upto the proximal cap. Proximal cap was penetrated with a Fielder XT guidewire and microcatheter was advanced over it. Hydrodynamic contrast recanalization was done as follows. The microcatheter was filled with pure contrast and ensured that it was free of air. Small amount of contrast was injected gently using a 2 mL Luer-lock syringe under cineangiography. Type 1 pattern of contrast distribution was seen in the CTO body. Afterwards, a workhorse guidewire was easily crossed across the lesion and parked in the distal left circumflex artery. After adequately preparing the lesion bed by predilation, stenting was done. Optimization of stents was done by adequate postdilation until desired results were achieved.

Conclusion: Hydrodynamic contrast recanalization appears to be a safe and promising novel contrast-based primary CTO crossing technique in patients with suitable anatomy. The technique has a short learning curve with good outcomes. Furthermore, it desnot compromise future options in case of failure like antegrade dissection and re-entry and retrograde techniques. Larger prospective studies are warranted in order to implement this technique as part of commonly followed CTO algorithms.

Keywords: Chronic total occlusion, hydrodynamic contrast recanalization, percutaneous coronary intervention

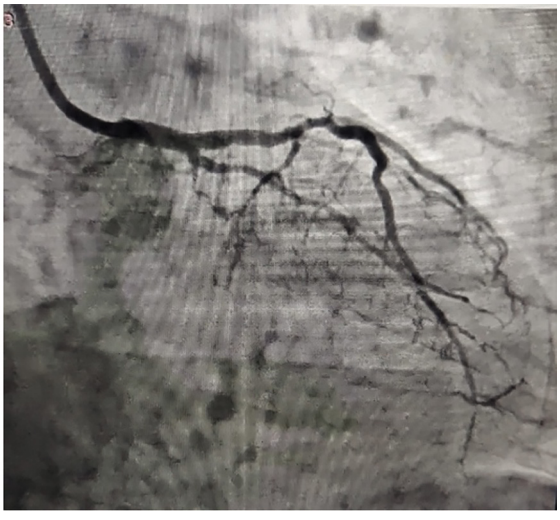


Figure 1. Diagnostic coronary angiogram prior to the procedure

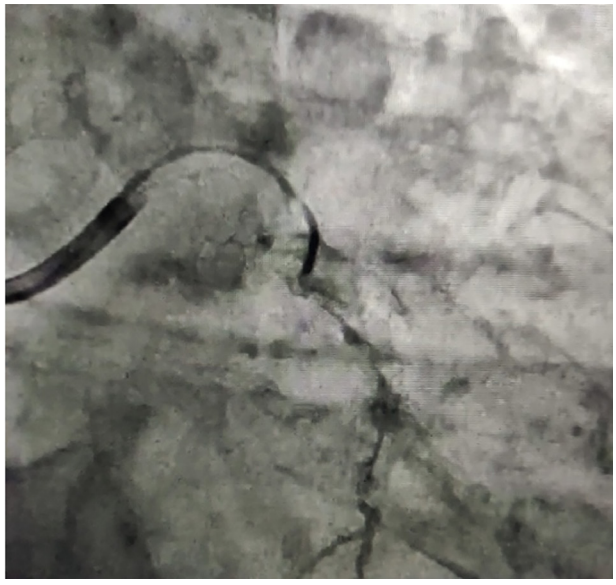


Figure 2. Hydrodynamic contrast recanalization of chronic total occlusion of left circumflex artery

Figure 3. Final coronary angiogram at the end of the procedure after stenting and post dilatation of the left circumflex artery

Native Left Circumflex Proximal In-Stent Chronic Total Occlusion Intravascular Ultrasound Guided Percutaneous Coronary Intervention in a Patient with Coronary Artery Bypass Grafting Who Had Diffuse Disease of Saphenous Vein Graft to Obtuse Marginal

Kurtuluş Karaüzüm

Department of Cardiology, Kocaeli University Faculty of Medicine, Arrhythmia Unit, Kocaeli

A 55-year-old man with a history of hypertension, type 2 diabetes mellitus and coronary artery bypass grafting [aorta to left anterior descending (Ao-LAD), aorta to obtuse marginal branch 2 (Ao-OM2)] performed 14 years earlier was admitted to the emergency department with exertional retrosternal chest pain that began the previous day. Electrocardiography revealed isolated T wave inversions in leads V5-V6. Transthoracic echocardiography showed a left ventricular ejection fraction of 60% with posterior wall hypokinesia. Laboratory analysis demonstrated elevated cardiac troponin levels, and the patient was diagnosed with non-ST elevation myocardial infarction prompting coronary angiography.

Coronary angiography revealed a chronically occluded stent at the ostium of the circumflex artery. The Ao-OM2 graft showed diffuse 80% stenosis and a 90% stenosis distally. The Ao-LAD graft was occluded, while native LAD and right coronary artery showed no significant lesions.

A CTO percutaneous coronary intervention of the native circumflex artery was planned. Using a Finecross microcatheter, multiple guidewires (Gaia Second, Gaia Third) were attempted, and successful lesion crossing was achieved with a Gladius EX wire. Stepwise predilatation was performed using sequential balloons: 1.0×12 mm, 1.2×12 mm, 1.5×15 mm, 2.0×20 mm, and 2.5×15 mm. Given the diseased nature of the graft, it was intentionally excluded from further use. A covered stent (3.0×20 mm Papyrus) was deployed at the anastomotic site of the graft, and a drug-eluting stent (3.0×34 mm Onyx TruCore) was placed in the proximal Cx. Post-dilatation achieved final Thrombolysis in myocardial infarction 3 flow without procedural complications. At six-month follow-up, the patient remained symptom-free.

LAD-Diagonal Double Bifurcation CTO PCI with Minicrush Stenting

Kurtuluş Karaüzüm

Department of Cardiology, Kocaeli University Faculty of Medicine, Arrhythmia Unit, Kocaeli

A 57-year-old man with a history of hypertension, type 2 diabetes mellitus, and coronary artery disease was hospitalized with non-ST elevation myocardial infarction. He had undergone right coronary artery (RCA) stenting one year earlier. Coronary angiography demonstrated a patent RCA stent and retrograde collateral filling of the distal left anterior descending (LAD) artery and the diagonal branch.

The LAD was occluded proximally and it was filling from the RCA. Also, the diagonal branch showed a 70% diffuse proximal stenosis and it was occluded from the mid segment with ipsilateral retrograde filling. Although surgical revascularization with coronary artery bypass grafting was recommended, the patient declined surgery. Therefore, complex bifurcation chronic total occlusion (CTO) intravascular ultrasound (IVUS)-guided percutaneous coronary intervention (PCI) was planned.

The LAD proximal CTO was successfully crossed using a Fielder XT-A guidewire supported by a Corsair Pro XS microcatheter. Sequential lesion preparation was performed with dedicated CTO and regular balloons (1.25×20 mm, 2.5×9 mm, and 2.75×9 mm). Subsequently, the diagonal mid CTO was crossed with Pilot 200 and Gaia second guidewires under microcatheter support and predilated using a 1.5×20 mm and 2.25x20 mm balloons. Two drug-eluting stents (DES) were deployed in the diagonal branch: a 2.5×30 mm Onyx TruCore stent in the mid segment and another 2.75×34 mm stent in the proximal segment, both inflated at 16 atmosphere. Then, diagonal proximal stent was minimally (1-2 mm) crushed with LAD DES (3x30 mm) implantation. Subsequently, first proximal optimization technique (POT) was performed with a non-compliant (NC) balloon (3.5x12 mm) in the LAD proximal stent segment. The D2 was then rewired, and sequential kissing balloon inflation was performed using NC balloons (2.75×12 mm for diagonal and 3.0×20 mm for LAD). The procedure was finalized with re-POT using a 3.5×8 mm NC balloon. Post-PCI IVUS image showed an optimal stent apposition and expansion (proximal LAD MSA: 9.8 mm^2) without edge problem.

The final result demonstrated no residual stenosis and TIMI-III flow. No procedural complications occurred.

Left Anterior Descending Chronic Total Occlusion Case Done Through the Hidden Conus Artery

Cuma Süleymanoğlu

Clinic of Cardiology, Osmaniye State Hospital, Osmaniye

Fifty-five years old ex smoker male patient, he has a history of hypertension and type 2 diabetes mellitus, angiography done at another center due to reversable ischemia detected by myocardial perfusion scintigraphy. Coronary an giography revealed both left anterior descending (LAD) and right coronary artery (RCA) chronic total occlusion (CTO) without any filling of the distal LAD (RENTROP 0) and mild distal RCA segment filling (RENTROP 1) without remarkable interventional connections. The medical council there decided that the patient is inoperable because of the hidden LAD. The patient referred to us for the interventional option. Bifemoral approach with Judkins Right to the right coronary and 3.5 extra backup to left system, while trying to engage the right coronary we noticed the hidden conus artery supplying the mid segment of the LAD by more than one epicardial collaterals, here our strategy changed to go Retrograde directly and then by reverse controlled antegrade and retrograde trackingwe (CART) can be able to achieve crossing the LAD CTO segment.

1.8 Finecross MG microcatheter (TERUMO) and suoh wire (ASAHI 0.014 guidewire) at the Retrograde gear then swith to Sion black (ASAHI 0.014 guidewire) and then we succeed to cross to the distal cap. Antegrade advancement by Gaia 2 (ASAHI 0.014 guidewire) and then guideliner assisted Reverse CART technique inside the CTO body, after balloon deflation we were be able to cross retrogradly by Gaia 2 and go into the guideliner then inside the guide catheter. Switch to antegrade gear by randevu technique, predilatation and finally achieve thrombolysis in myocardial infarction 3 flow of the LAD artery.

In such these cases we have to be aware of the collaterals, they can be any where else than the usual connections or at different anatomical locations, so we have to be carefull while analsing the angiogram before proceed to any procedure especially complex ones like CTOs which upfront strategy and others can carry leathal complications. Also in such cases where the anatomy is hidden the coronary CT scan can be life saving and it can be determinant of the strategy and it can be the key which can change the game before it start.

Retrograde Percutaneous Coronary Intervention Could be an Option for Antegrade Wire Escalation Perforation

Mehdi Toluey

Clinic of Cardiology, Valiasr International Hospital, Tabriz, Iran

Aim: A 76-years-old-male with history of coronary artery bypass graft (CABG) 15 years ago, was referred us for coronary angiography (CAG).

Case Report: CAG revealed a subtotal lesion at insertion site of saphenous vein graft (SVG) to main obtuse marginal. Lima to left anterior descending and SVG to right coronary artery was patent. We decided to chronic total occlusion (CTO) percutaneous coronary intervention (PCI) of native left circumflex CTO via antegrade approach. Antegrade wire escalation (AWE) was failed and led to wire perforation. We managed perforation with balloon tamponade technique and changed plan to retrograde approach via SVG. We used reverse controlled antegrade and retrograde tracking technique for externalization and then PCI was done via antegrade approach and perforation was sealed.

Post-CABG patients commonly present with degenerated SVGs and recurrent ischemia. Contemporary guideline and observational data favor attempting PCI of the native coronary artery when feasible rather than intervening on an SVG. Native-vessel PCI is associated with lower rates of periprocedural slow-flow/no-reflow, distal embolization, repeat revascularization and long-term major adverse cardiac events compared with SVG PCI. Retrograde approach via SVG could be a safe and lifesaving option when, AWE was failed or complicated with perforation.

Conclusion: In post CABG patients' native vessels PCI are superior to degenerated SVGs. In case of CTO, retrograde approach via SVG could be a safe and lifesaving option.

Keywords: Antegrade wire escalation, chronic total occlusion, coronary artery bypass graft, retrograde approach, saphenous vein graft

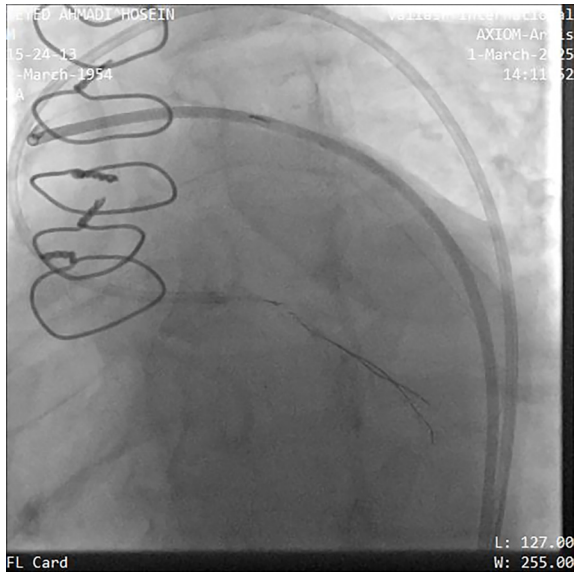


Figure 1. Wire perforation after AWE technique

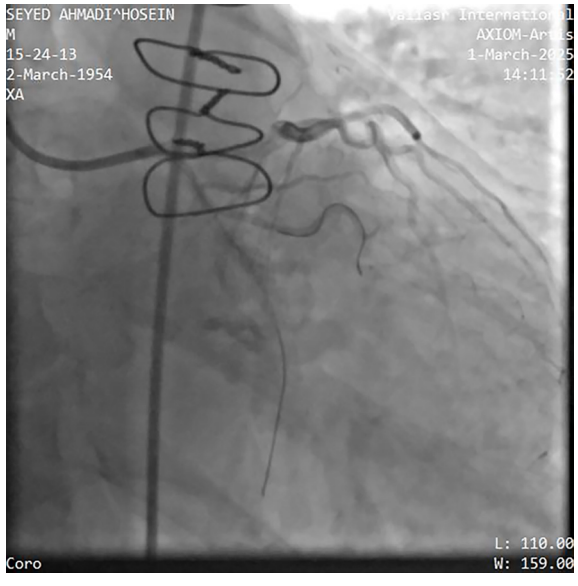


Figure 2. Reverse CART technique via SVG for externalization

Retrograde Recanalization of a Circumflex Artery Chronic Total Occlusion via Corkscrew-Shaped Epicardial Collateral Channels

Muhammed Ulvi Yalçın

Department of Cardiology, Selçuk University Faculty of Medicine, Konya

Collateral vessels play a key role in chronic total occlusion (CTO) procedures.

Septal and epicardial collaterals are often utilized to facilitate access to the target vessel during intervention. While septal collaterals are generally preferred due to their relative safety, epicardial collaterals can also be used when necessary. The presence of corkscrew-shaped epicardial collaterals may increase procedural complexity but does not constitute a contraindication.

A patient with a history of diabetes mellitus was referred from an external center. Although coronary artery bypass grafting was recommended, the patient declined surgical intervention. The patient was scheduled for a CTO procedure targeting the circumflex artery (CX).

An Extra Backup guiding catheter was engaged in the left main coronary artery, and with the support of a Finecross microcatheter, an antegrade approach was attempted using Fielder XT-A, Gaia Second and Asahi Suoh Q3 guidewires. However, the CTO could not be crossed via the antegrade route. As a next step, a retrograde approach was attempted via a corkscrew-shaped epicardial collateral originating from the left anterior descending artery (LAD), again using Finecross microcatheter support. Guidewires including Fielder XT-A, Gaia Second, Asahi Suoh Q3, and Whisper LS were used. Eventually, successful access to the distal CX was achieved using a Gaia Third wire. The system was externalized into the antegrade guide. Sequential pre-dilatation was performed using a 2.5×15 mm balloon. Subsequently, a 3.0×44 mm drug-eluting stent (DES) was implanted in the distal segment and a 3.5×24 mm DES in the proximal segment. Post-dilatation was carried out with a 3.0×25 mm balloon, followed by proximal optimization technique using a 3.5×12 mm non-compliant balloon. Thrombolysis in myocardial infarction grade 3 flow was achieved. Intervention of the LAD and remaining right coronary artery lesions was planned for a separate session.

With proper device selection and thorough pre-procedural planning, complex percutaneous coronary intervention via corkscrew-shaped epicardial collaterals can be performed successfully in experienced hands.

In this case, we successfully recanalized a CX CTO via a retrograde approach using corkscrew-shaped epicardial collaterals.

Retrograde Recanalization of a Chronic Total Occlusion in an Anomalous RCA

Muhammed Ulvi Yalçın

Department of Cardiology, Selçuk University Faculty of Medicine, Konya

Anomalous origin of coronary arteries are observed in approximately 1% of cases and may require specialized equipment and techniques during percutaneous coronary intervention (PCI).

A 62-year-old male patient was referred to our center from an external facility due to a significant lesion in the circumflex artery (Cx) and an anomalous origin with chronic total occlusion (CTO) of the right coronary artery (RCA). One month prior, the patient had undergone PCI for the Cx, and PCI for the RCA was planned.

After evaluating the previous angiographic images, it was decided to approach the RCA CTO via a retrograde technique through septal branches of the left anterior descending artery. An extra backup catheter was engaged in the left main coronary artery, and an Amplatz Left catheter was used for the anomalous RCA. Retrograde access was attempted using Whisper SL, Sion, Pilot 150, and Miracle 12 guidewires in sequence. Eventually, the distal RCA was successfully accessed using a Gaia Second wire. Pre-dilatation was performed with a 2.5×30 mm balloon, followed by implantation of 3.0×33 mm and 3.5×44 mm drug-eluting stents. Post-dilatation was performed using a 4.0×12 mm non-compliant balloon, achieving thrombolysis in myocardial infarction grade 3 flow.

With appropriate device selection and thorough pre-procedural planning, complex PCI can be successfully performed even in cases with anomalous RCA origin, when undertaken by experienced operators. In this case, we successfully recanalized an RCA CTO with an anomalous origin using a retrograde approach.

Successful Management of Septal Artery Perforation

Muhammed Zeki Mertcan

Department of Cardiology, Binali Yıldırım University, Mengücek Gazi Training and Research Hospital, Erzincan

Aim: Retrograde chronic total occlusion (CTO) interventions are critical techniques for achieving revascularization in complex coronary anatomies. However, complications that may develop during the use of collaterals (e.g., septal artery perforation) can make the procedure more difficult. This case presents the successful management of a septal perforation with coil implantation during a retrograde CTO procedure and highlights the clinical importance of complication strategies.

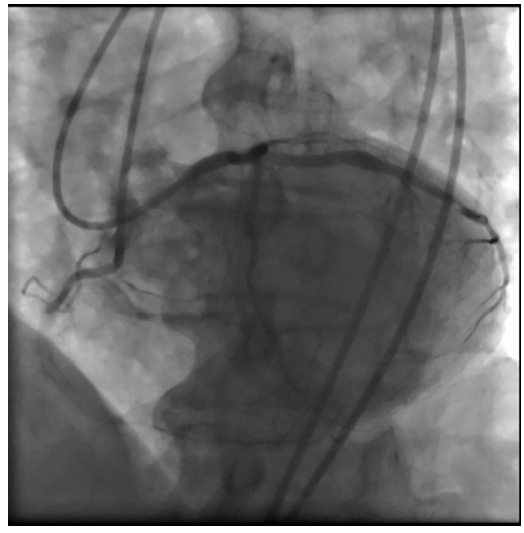
Case Report: A 68-year-old male patient presented with exertional dyspnea and angina for 6 months. He had a known history of hypertension and coronary artery disease, with a history of OM1 stenting in 2019. Physical examination and laboratory tests were normal, and left ventricular ejection fraction was 55%. Myocardial perfusion scintigraphy showed 12% ischemia in the inferoposterior wall, and coronary angiography was planned.

Angiography revealed CTO of the right coronary artery (RCA) starting from the proximal stent segment. It was observed that the RCA was retrogradely filled via left anterior descending (LAD) septal collaterals. Therefore, a retrograde CTO intervention was planned. Access was obtained via the right femoral and right radial arteries. After dual injection, the RCA posterior descending artery (PDA) was reached via LAD septal-2 using a Corsair XS Pro microcatheter and Sion Black guidewire. The distal cap was penetrated with a Gaia Second guidewire, and the CTO segment was crossed. The microcatheter was advanced into the AL1 using the trap technique, and wire exchange was performed with an RG3 guidewire. After predilatation, antegrade flow was established, and the procedure continued antegradely.

The RCA was wired antegradely with a Sion Blue ExtraSupport, and dilation was performed with PTCA balloons. Control angiography revealed perforation in the proximal LAD septal-2 and distal PDA. Echocardiography showed minimal pericardial effusion, and hemodynamics were stable. Coils were implanted into the perforated segments, and the extravasation was brought under control. In-stent optimization of the RCA was performed with NC balloons, and Thrombolysis In Myocardial Infarction grade 3 flow was achieved, successfully completing the procedure.

Conclusion: Retrograde CTO interventions are procedures that require high technical skill and carry a high risk of complications. In this case, the CTO was crossed using a retrograde technique, but a septal artery perforation occurred. The perforation was successfully managed with coil implantation, and hemodynamic stability was maintained. This experience demonstrates that complications can be brought under control with rapid assessment and appropriate intervention. Teamwork by an experienced staff and preparedness for complications are key to successful clinical outcomes.

Figure 1. Management of Septal Artery Perforation with Coil Implantation in Retrograde Chronic Total Occlusion Procedure



LAD + RCA CTO

Mustafa Tunahan Öz

Department of Cardiology, Bahçeşehir University Faculty of Medicine, İstanbul

A 79-year-old woman with HTN+, DM+, HPL+, and baseline echocardiography showing left-ventricular ejection fraction ≈40% with global hypokinesis, moderate tricuspid regurgitation, and mild mitral regurgitation presented with non-ST-elevation myocardial infarction at an outside hospital. Coronary angiography revealed a proximal right coronary artery (RCA) lesion that was treated with plain balloon angioplasty; the distal RCA remained a chronic total occlusion (CTO). The left anterior descending (LAD) artery was also a CTO. Surgical revascularization was recommended, but the patient declined, and ad-hoc dual-CTO percutaneous coronary intervention (PCI) in the same session was planned in light of ongoing ischemia and patient preference.

The LAD CTO was addressed first via an antegrade approach using a Gaia Second (Asahi) guidewire supported by a microcatheter. After successful wire crossing and lesion preparation, a crossover stent from the left main coronary artery into the LAD was deployed with good angiographic result and restoration of Thrombolysis In Myocardial Infarction grade 3 flow. The LAD portion of the procedure was notable only for a tiny septal branch perforation without hemodynamic consequence.

Attention then turned to the distal RCA CTO. The occlusion was crossed with a Gaia Second wire; during subsequent microcatheter advancement, a septal perforation occurred with contrast extravasation. Bail-out hemostasis was achieved by embolization using autologous fat harvested from the groin and delivered through the microcatheter, yielding immediate angiographic cessation of extravasation. The patient was clinically stable post-procedure, and immediate transthoracic echocardiography did not show a significant pericardial effusion.

Approximately 24 hours later, the patient developed hypotension, dyspnea, and pulsus paradoxus. Urgent echocardiography demonstrated a large circumferential pericardial effusion with right-sided chamber collapse, consistent with cardiac tamponade. Cardiothoracic surgery evacuated an organized hemopericardium/hematoma. Hemodynamics normalized promptly, and follow-up echocardiograms showed stable pericardial status with left ventricular ejection fraction unchanged from baseline. The remainder of the hospital course was uneventful, and she was discharged on guideline-directed medical therapy with close follow-up.

This case underscores three practical lessons: (1) same-session dual-CTO PCI, while feasible, compounds perforation risk; (2) distal septal perforations controlled angiographically can still cause delayed tamponade, warranting extended (≥24–48 h) monitoring with repeat echocardiography; and (3) autologous fat embolization is an effective rescue technique for distal septal perforations, but clinicians should maintain high vigilance for late effusion and intervene promptly if tamponade physiology emerges.

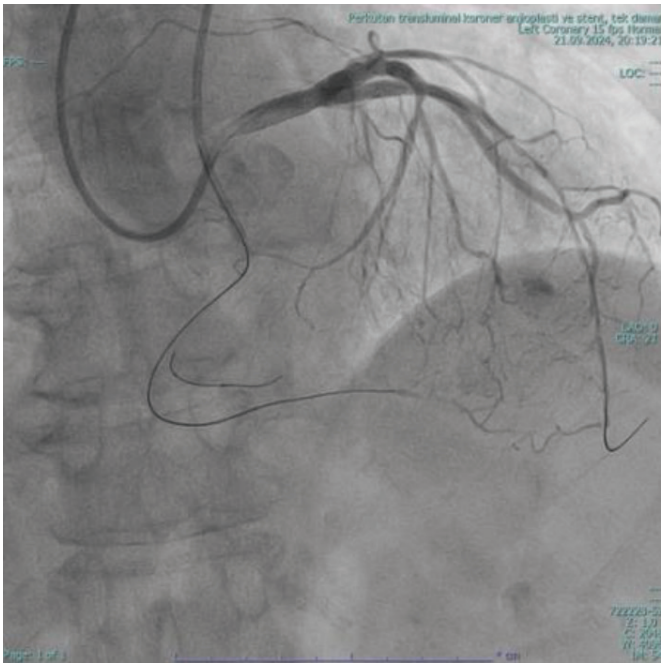


Figure 1. Pre-procedural intravascular ultrasound (IVUS) demonstrating diffuse and circumferential (360°) calcification with extensive plaque burden proximal to the D1 branch

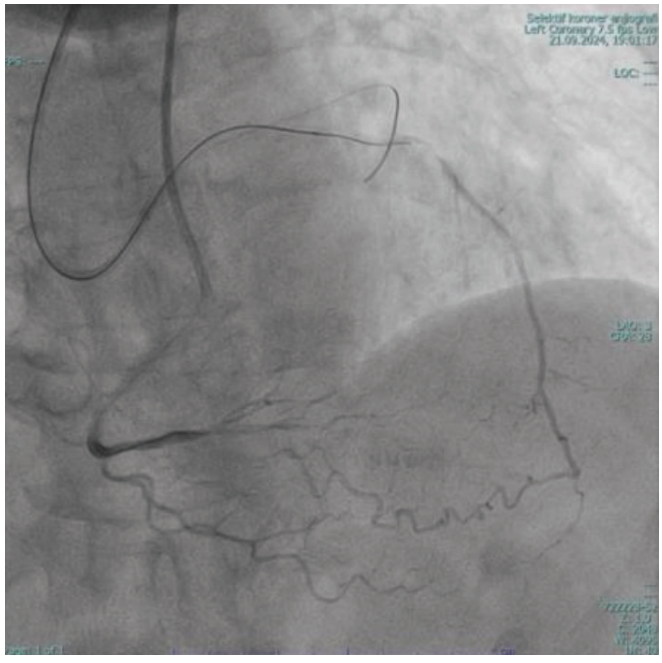


Figure 2. Post-procedural intravascular ultrasound (IVUS) following Shockwave lithotripsy and drug-coated balloon (DCB) angioplasty. The calcified nodule was successfully fractured; however, the mid-LAD segment was planned for re-intervention after three weeks, and the patient was scheduled for an elective procedure

IVL + IVUS + LAD CTO

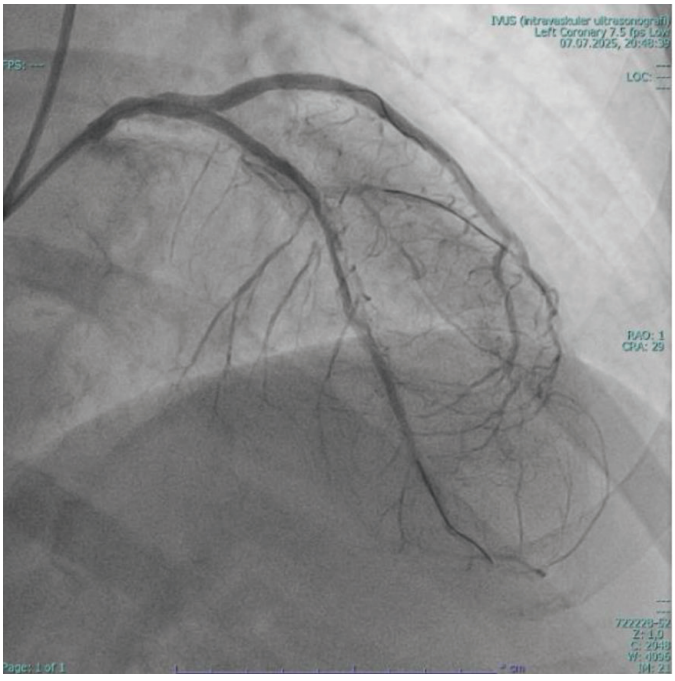
Mustafa Tunahan Öz

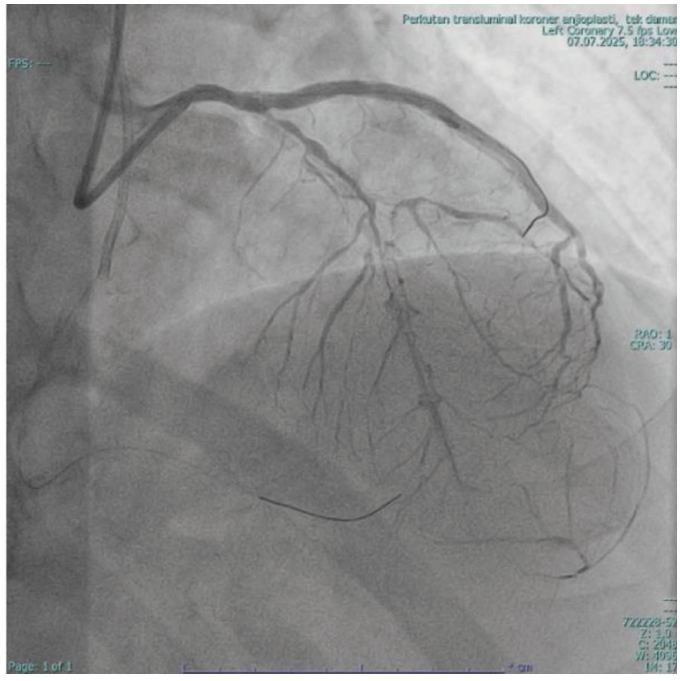
Department of Cardiology, Bahçeşehir University Faculty of Medicine, İstanbul

A 59-year-old man with long-standing hypertension, diabetes mellitus, and hyperlipidemia presented with recurrent chest pain and exertional dyspnea. Transthoracic echocardiography revealed a left ventricular ejection fraction of 35% with anterior wall hypokinesia, mild-to-moderate mitral regurgitation, and mild tricuspid regurgitation. Carotid duplex had shown bilateral non-obstructive atherosclerotic plaques. His coronary history included an anterior myocardial infarction in 2012 treated with LAD PCI; a critical RCA stenosis treated with PCI in 2015; RCA in-stent restenosis (ISR) managed with plain balloon angioplasty in 2019; and LAD ISR treated with plain balloon angioplasty in 2023.

On this admission, coronary angiography demonstrated LAD ISR with a distal 100% chronic total occlusion (CTO) and a distal 100% CTO of the circumflex (Cx) artery, with the Cx bed supplied via collaterals from the RCA. A stepwise CTO strategy was employed. Using a microcatheter for support and a Gladius EX14 guidewire, the LAD CTO segment was successfully crossed. Nevertheless, a proximal, angiographically "classic" 360° calcified nodule proved undilatable with standard balloons. A scoring balloon was attempted without success. Intravascular lithotripsy (shockwave) with a 3.5×12 mm balloon was then performed, enabling effective calcium modification and expansion of the lesion.

Following calcium fracture, drug-coated balloon (DCB) angioplasty was delivered to the diseased LAD segments with 2.75×40 mm and 3.0×40 mm DCBs, avoiding additional metal implantation in this multiply stented vessel. Final angiography showed restoration of flow to the left coronary system with TIMI grade 3 perfusion and no angiographic complications such as dissection or perforation. The patient was managed on guideline-directed medical therapy for ischemic cardiomyopathy and started on dual antiplatelet therapy per the institutional DCB protocol. Given the reduced ejection fraction and multivessel, heavily calcified disease with prior ISR and CTOs, close clinical follow-up was planned, including optimization of heart-failure therapies and surveillance for recurrent ischemia. The procedure achieved successful revascularization of the left system in a complex, high-risk anatomy.





A Retrograde Recanalization of a Right Coronary Artery Chronic Total Occlusion: A Case Report

Sami Ullah

Department of Chemistry, King Khalid University, Abha, KSA

Aim: Chronic total occlusion (CTO) represents one of the most technically demanding subsets of percutaneous coronary intervention (PCI), with lower procedural success and higher complication risks compared with non-CTO lesions. Recent advances, particularly the retrograde approach and dissection-re-entry strategies such as reverse controlled antegrade and retrograde tracking (reverse-CART), have significantly improved outcomes. Nonetheless, complications such as intramural hematoma remain clinically important, requiring intravascular imaging for recognition and management.

Case Report: A 60-year-old hypertensive male, previously treated with drug-eluting stents (DES) to the right coronary artery (RCA), presented with NSTEMI. Echocardiography revealed preserved left ventricular function ejection fraction 58%. Angiography showed RCA CTO and an anomalous left circumflex (LCx) with diffuse disease. The LCx was managed with drug-eluting balloon angioplasty, and the patient was discharged. One month later, he developed exertional dyspnea and post-prandial angina. Given persistent symptoms, complex PCI of the RCA CTO was planned after detailed counselling and consent. Antegrade attempts with AL1 and JR catheters and a Gaia 3rd wire failed. A retrograde approach via septal collaterals was attempted. Advancement of the Turnpike LP micro-catheter required septal dilatation. A CP12 wire successfully crossed retrogradely but catheter passage remained limited, and the antegrade wire also failed to progress. Hydrodynamic contrast recanalization (HDR) was attempted, facilitating wire advancement but resulting in a large hematoma, confirmed on intravascular ultrasound (IVUS). Reverse-CART was then successfully performed, with externalization of the CP12 wire.

Predilatation was followed by deployment of two drug-eluting stents. IVUS confirmed sealing of the hematoma and restoration of TIMI-3 flow. The patient tolerated the procedure well, remained stable during monitoring, and was discharged in good condition. This case highlights the role of retrograde CTO PCI when antegrade approaches fail. The reverse-CART technique has become a cornerstone in complex CTO recanalization, but complications such as intramural hematoma may occur, particularly following HDR. Intravascular imaging was essential in detecting the hematoma and guiding appropriate stent optimization. Previous reports also underscore the importance of careful collateral preparation to minimize risks.

Conclusion: Retrograde RCA CTO PCI demands advanced technical expertise and flexibility. Despite procedural challenges, favorable outcomes can be achieved when complications are promptly identified and managed. This case emphasizes the evolving role of retrograde strategies and the indispensable contribution of IVUS in complex CTO interventions.

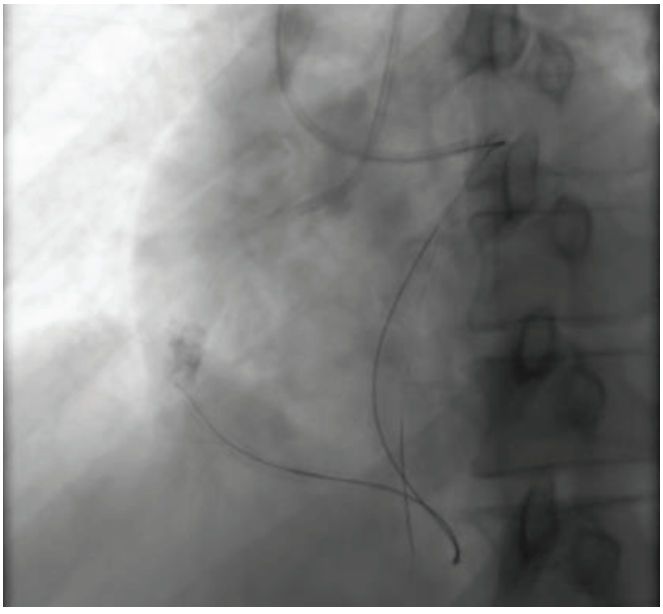


Figure 1. Hydrodynamic contrast recanalization through the antegrade microcatheter

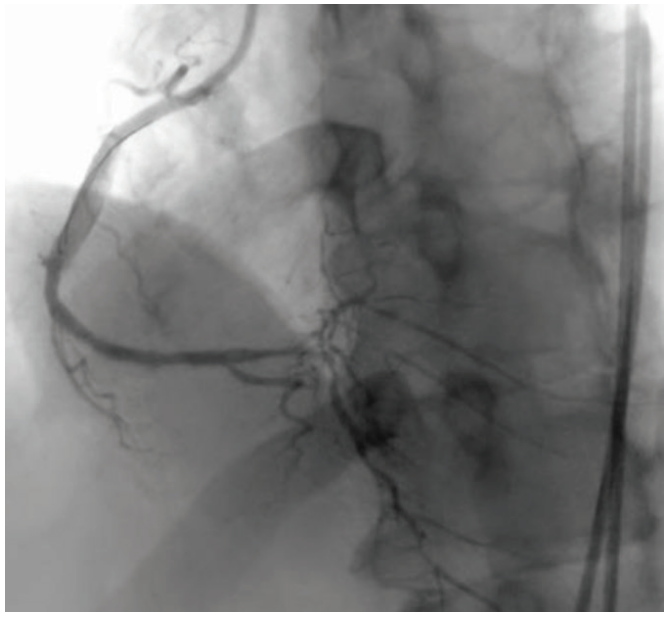


Figure 2. Final image with large hematoma and acceptable result

Hybrid Revascularisation of an Anomalous Circumflex CTO Summary

Sezgin Uzunoğlan

Department of Cardiology, Bezmialem Vakıf University, İstanbul

A 41-year-old patient with a history of inferior STEMI and right coronary artery (RCA) stenting in May 2025 was admitted to the outpatient clinic with exertional angina. The patient had undergone a second RCA stent placement the day after the initial procedure due to acute stent thrombosis. Coronary angiography revealed that the circumflex (Cx) artery originated anomalously from the right cusp, and a chronic total occlusion (CTO) was identified in the Cx artery. The patient was subsequently hospitalized for percutaneous coronary intervention of the Cx CTO.

The procedure was initiated via right radial access using a 6 French AR1 catheter. A Finecross microcatheter was advanced to the proximal CTO cap over a choice guidewire. Attempts to cross the CTO with a Pilot 50 wire were unsuccessful; thus, escalation to a Gaia 2 wire was performed, successfully crossing the lesion. After confirming wire placement within the distal true lumen, balloon angioplasty was performed using a 1.25x15 mm balloon, resulting in restored flow to both the Cx and obtuse marginal (OM) branches. The OM artery was then wired with a choice guidewire, followed by balloon angioplasty with a 2.5x30 mm balloon in both the CTO and proximal segments. Finally, a 3.0x15 mm Onyx stent was deployed in the proximal segment, and a 2.75x30 mm Eurocor drug-coated balloon was applied at 7 atm for 180 seconds in the CTO segment. The procedure concluded with an excellent angiographic result and no residual stenosis.

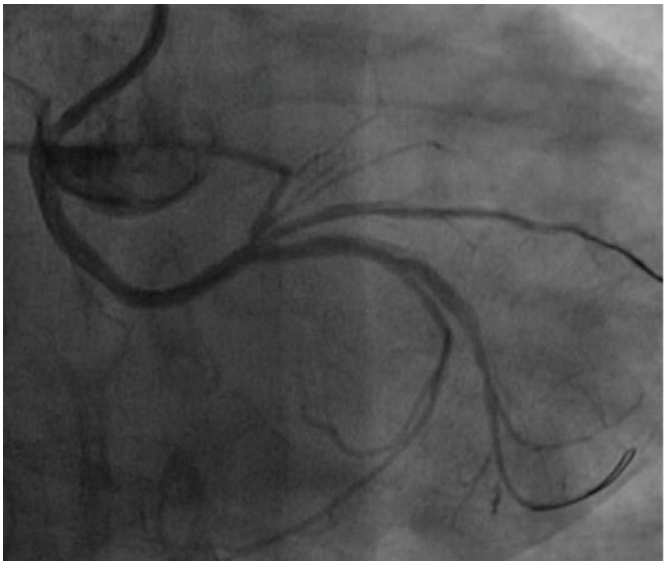


Figure 1. Anomalous Cx CTO

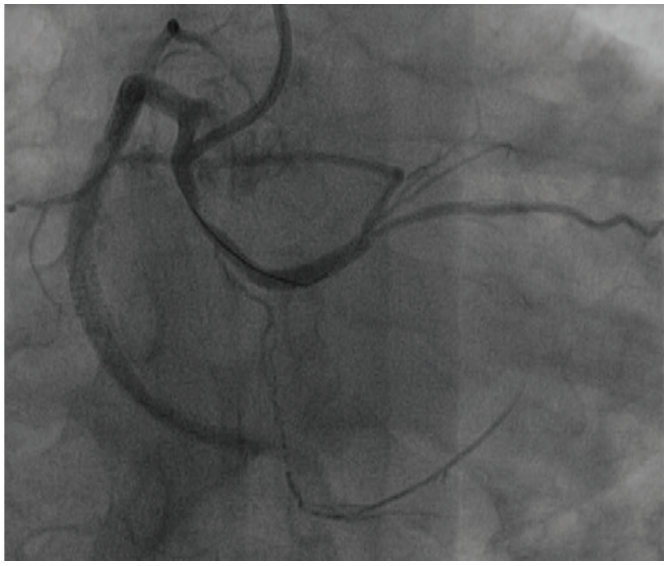


Figure 2. Final result

High-risk Cx CTO Recanalized with Hybrid Antegrade and Retrograde Approach

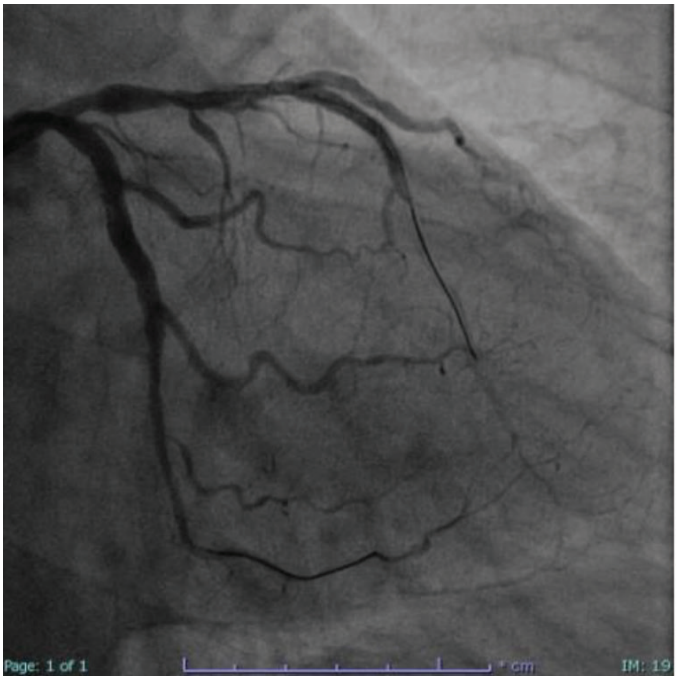
Sezgin Uzunoğlan

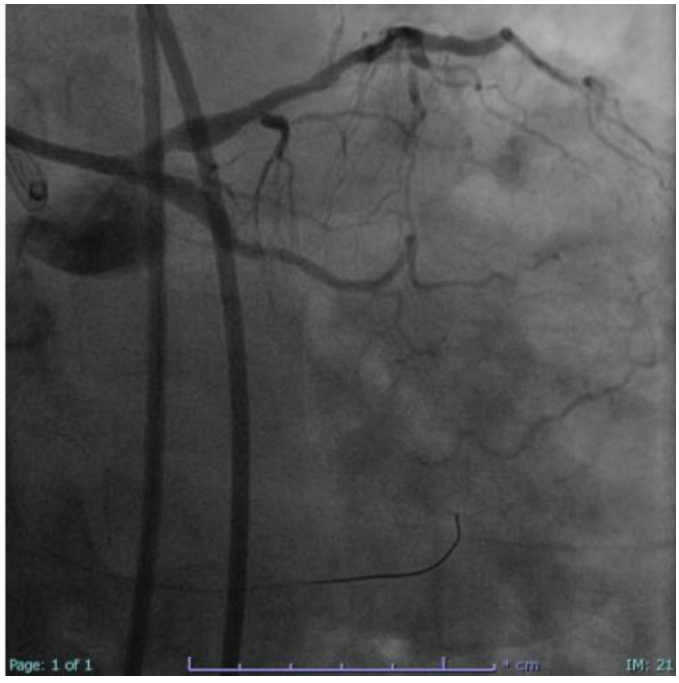
Department of Cardiology, Bezmialem Vakıf University, İstanbul

A 66-year-old male with a history of hypertension, diabetes mellitus, hypothyroidism, and long-term smoking presented with Canadian Cardiovascular Society Class II angina. His past history included percutaneous coronary intervention (PCI) with a drug-eluting stent to the left anterior descending (LAD) artery in 2005. A coronary angiogram performed in August 2025 revealed a distal LAD chronic total occlusion (CTO), a CTO of the circumflex (Cx) artery, and a critical mid right coronary artery (RCA) stenosis. Although coronary artery bypass grafting was recommended, the patient declined surgical revascularization and was admitted for complex multivessel PCI and despite guideline-directed medical therapy with aspirin, clopidogrel, isosorbide mononitrate, ranolazine, and trimetazidine, he continued to be symptomatic. 3 vessel percutaneous intervention was planned.

The procedure was initiated via bilateral femoral access with 7F sheaths. An antegrade approach using Conquest Pro 9 for proximal cap penetration was attempted; however, further advancement with Gaia-3 and Gladius MG wires was unsuccessful. Given the difficulty, a retrograde strategy was adopted through the RCA. A significant mid-RCA stenosis was treated with a 4.0×18 mm Onyx drug-eluting stent, post-dilated with a 4.5×12 mm non-compliant balloon. A Finecross microcatheter was advanced into the RCA, enabling retrograde contrast injection. Subsequently, a Sion Black wire was successfully advanced into the distal Cx. With the help of antegrade tip injection and the just marker technique Cx crossed with a Pilot 200 wire. However, due to the risk of trapping the obtuse marginal branch by subintimal flap, the decision was made to continue with a retrograde approach. Using the reverse controlled antegrade and retrograde subintimal tracking (reverse controlled antegrade and retrograde tracking) technique, the lesion was successfully crossed with a Gladius MG wire. The retrograde wire was then externalized into the antegrade guide catheter (rendezvous technique), and after collateral channel confirmation, the system was switched back to an antegrade approach.

Predilatation was performed with a 2.5×20 mm balloon, followed by implantation of a 3.0×34 mm drug-eluting stent. Additional distal balloon angioplasty with a 2.0×20 mm balloon was performed, resulting in full restoration of vessel patency with excellent final angiographic results.





Drug-Coated Balloon-Only Strategy for Chronic Total Occlusion: A Prospective, Two-Center Study of 48 Patients

Sherzod Akhmedov[1], Ilkom Jurayev[2], Javokhir Akhrorov[2], Sherzod Sharipov[2], Bekzod Bakhramov[1], Bekhruz Bakhronov[2], Shermuhammad Tursunov[2]

[1]Ezgu Niyat Clinic, Tashkent, Uzbekistan

[2]Carmen Clinic, Bukhara, Uzbekistan

Aim: Drug-coated balloon (DCB) angioplasty offers the advantage of delivering antiproliferative drugs without leaving a permanent metallic scaffold, but its role in chronic total occlusion (CTO) remains unclear. CTO percutaneous coronary intervention (PCI) is technically demanding, often requiring extensive lesion preparation and stenting. This study evaluated the feasibility, safety, and outcomes of a DCB-only approach guided by intravascular imaging and physiology.

Methods: Between January 2023 and May 2025, 42 patients with de novo CTOs underwent PCI using a DCB-only strategy at two centers in Uzbekistan. Exclusion criteria were in-stent CTO, acute coronary syndrome, or contraindication to dual antiplatelet therapy. Lesion crossing was achieved by standard antegrade or retrograde techniques. All cases underwent meticulous lesion preparation with high-pressure, cutting, or scoring balloons. Intravascular ultrasound or optical coherence tomography confirmed lumen gain, vessel sizing, and dissection assessment. Where angiography showed non–flow-limiting dissections, instantaneous wave-free ratio (iFR) was used to exclude ischemia. Paclitaxel-coated balloons sized 1:1 to vessel diameter were inflated for ≥60 seconds. Bail-out stenting was reserved for flow-limiting dissections.

Results: Mean patient age was 61±9 years; 71% were male. Target vessels were right coronary artery (52%), left anterior descending artery (33%), and left circumflex artery (15%). The mean J-CTO score was 2.3±0.7, with calcification in 48%. Procedural success (<30% residual stenosis, TIMI 3 flow, no in-hospital MACE) was achieved in 95%. Bail-out stenting was required in 2 patients (5%). Imaging confirmed adequate lumen gain in all cases. Non-flow-limiting dissections occurred in 33%, all confirmed non-ischemic by iFR (mean 0.93±0.04). At 12-month follow-up, 90% of patients were angina-free (CCS 0-I), clinical restenosis occurred in 2 patients (4.8%), and no target vessel thrombosis was observed. One-year MACE-free survival was 92.9%.

Conclusions: A DCB-only PCI strategy for *de novo* CTO lesions, when guided by systematic imaging and physiological assessment, is feasible and safe, with high procedural success and favorable 1-year outcomes. Careful lesion preparation, imaging verification, and selective iFR use are essential to avoid unnecessary stenting. This stentless approach may reduce long-term stent-related complications and preserve vessel physiology, though larger randomized trials are needed to validate these results.

Figure 1. RCA CTO before PCI
RCA: Right coronary artery, CTO: Chronic total occlusion, PCI: Percutaneous coronary intervention

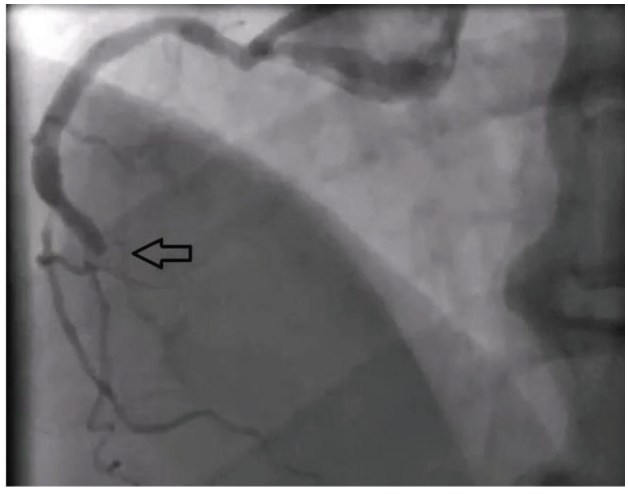


Figure 2. RCA after 6-month DCB
RCA: Right coronary artery, DCB: Drug-coated balloon

Successful Native RCA CTO Revascularization in a Post-CABG Patient Presenting with Acute Coronary Syndrome

Yasin Özen, Abdullah Tunçez, Hüseyin Tezcan

Selcuk University Faculty of Medicine Hospital

Aim: Patients with prior coronary artery bypass grafting (CABG) who present with acute coronary syndrome (ACS) represent a therapeutic challenge. Saphenous vein grafts (SVGs) are prone to degeneration, thrombosis, and occlusion over time. In patients presenting with ACS, the last resort may be to open the chronic total occlusion (CTO) vessel. Current evidence suggests that percutaneous coronary intervention (PCI) of the native vessel yields higher procedural success and better long-term patency compared with graft intervention, particularly in CTO lesions.

Case Report: A 49-year-old male with diabetes, hypertension, and prior CABG [2016; patent left anterior descending artery (LAD), degenerated SVG-OM and SVG-right coronary artery (RCA)]) presented with acute inferior myocardial infarction. Coronary angiography revealed LAD proximal 90%, Cx proximal 100%, RCA mid 80% and distal 40% stenosis. The SVG-RCA was completely occluded and heavily thrombosed. Initial PCI attempt on the graft failed. During this period, the patient developed complete AV block and was monitored with a temporary pacemaker. Because the occlusion persisted on follow-up angiography after tirofiban infusion, a CTO procedure was planned for the native RCA artery. A retrograde approach using SVG was attempted, but was unsuccessful due to the angle at the anastomosis site. Using bilateral injections, retrograde approach was performed via LAD septal collaterals. Through a surfing technique, the wire successfully dropped into the distal RCA. With Corsair Pro XS microcatheter support and multiple guidewires (Runthrough, Conquest Pro 12, Fielder XT, Chikai), the CTO was crossed. The retrograde wire was externalized and converted to antegrade. Predilatations were performed, followed by implantation of overlapping DES (4.0×48 mm, 3.0×48 mm proximally; 2.5×48 mm extending to PDA). Final TIMI 3 flow was achieved without complications. During follow-up, the patient recovered dramatically from complete AV block.

Conclusion: This case emphasizes that in post-CABG ACS patients, even with acutely occluded SVGs, native vessel CTO PCI using septal surfing can achieve successful revascularization. A rare indication for the CTO procedure is ACS. In line with guidelines, native CTO PCI should be considered the preferred strategy over degenerated graft PCI.

Keywords: Acute coronary syndrome, CABG, native vessel, PCI, CTO

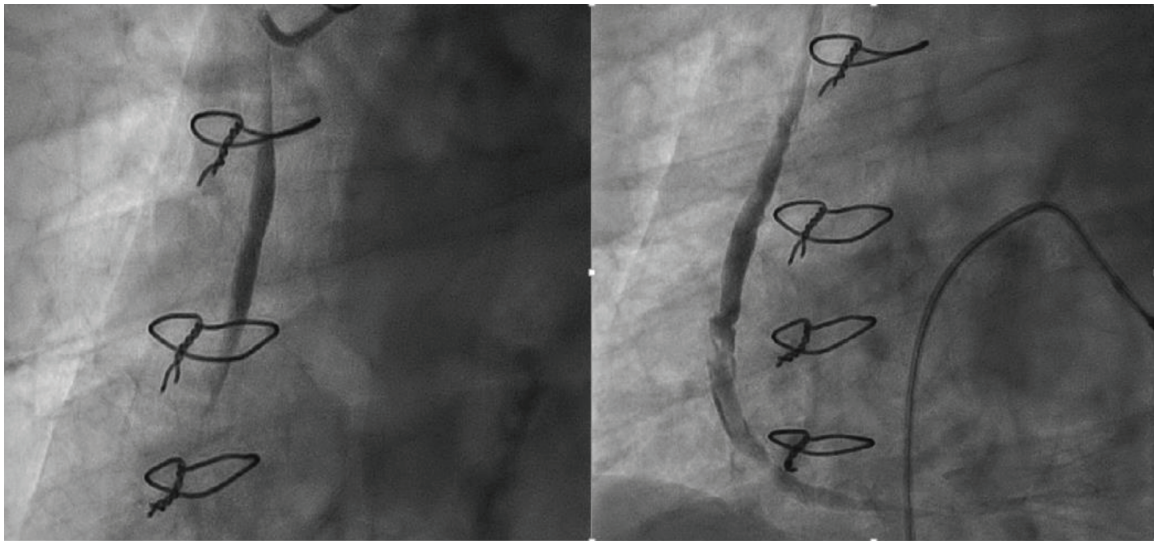


Figure 1. Acute total occlusion of the Ao-SVG-RCA graft
Ao-SVG-RCA:Aorta-saphenous vein graft-right coronary artery

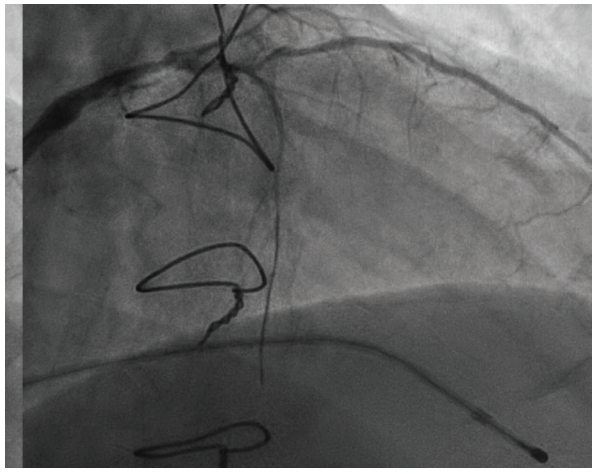


Figure 2. Septal collateral surfing

Perforation During Recanalization of RCA

Yusuf Burkhonzoda, Mahmadzarifsho Jamoliddinov

NEKDIL Clinic, İstanbul

Patient 69 y. o. women ischemic heart disease. Stable angina 3rd functional class. At 2020 patient suffered from posterior myocardial infarction. Congenital elevation of left hemidiaphragm. Compression of the left Lung to the top, Dextrocardia. Chronic obstructive pulmonary disease II. ECHO EF =53%. Left anterior descending artery-70% stenosis of the proximal segment; 60%-stenosis of the middle segment; Right coronary artery (RCA)-occlusion of the middle segment. Distal segments filled by bridging collaterals.

We started recanalization of RCA procedure with 6 French guide catheter with antegrade cahronic total occlusion access. Recanalization with guide wire Fielder + balloon was unsuccessful. Then we attempted to pass the second guide wire Fielder XT-A through the occlusion but it was unsuccessful. Our third guide wire Gaia II successfully passed through occlusion to the distal part of the RCA. Was provided predilatation of the RCA by balloon 1.5x12mm. In the control angiography we found Perforation of RCA (ELLIS III). Immediately we inflate balloon 1.5x12mm and changed to 2.5x8mm balloon. We inflated balloon 10 min (10 atm.) and deflated every 10 min by 30 second. In control angiography extravasation still active (Ellis III). We cut Hemodynamic sponge in to micro particles, mixed with contrast and then 5 mL cocktail was injected through microcatheter to occlude the artery. In control angiography extravasation slower, but still active. At this time, patient condition was critic, SPO_2 88% with 6 L/min oxygen, Blood pressure (BP) 80/50 mm Hg, heart rate 100 beat/min, respiratory rate as 35. Immediately we performed Pericardiocentesis with 0° subcostal access, because patient had Dextrocardia. Was inserted 5 Fr Introducer in to pericardial cavity and then advanced 4 Fr Pigtail catheter. We performed 1.6 litter blood autotransfusion.

Then guide wire advanced to the distal segment of RCA. After predilatation of middle RCA with 1.5x12mm, 2.5x8mm balloons we implanted double layer stenting 2.75x38mm and 3.0x38mm (20 atm.) in the middle segment of RCA. In control angiography the sign of extravasation is absent. Patient condition is stable (BP 110/80mm Hg, HR 74 b/m, SPO_2 98%). We transferred patient to the ICU department for further observation and at 7th day we discharged patient in good condition.

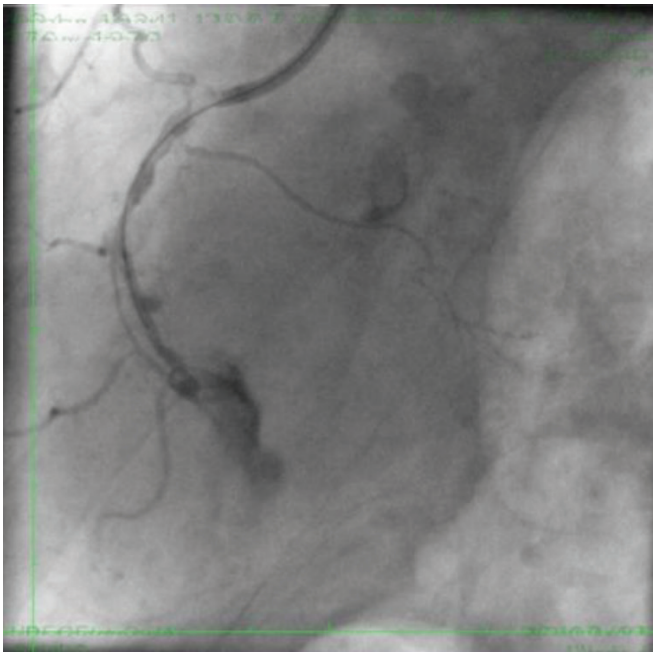


Figure 1. Perforation of RCA (Ellis III)
RCA: Right coronary artery

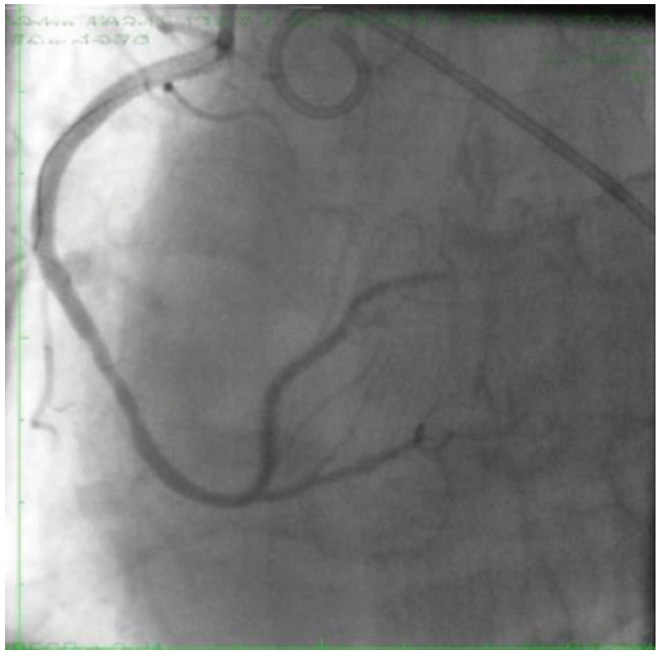


Figure 2. After double layer stenting

Use of the "Just Marker" Technique to Facilitate Successful LAD CTO Revascu

Kadri Murat Gürses

Department of Cardiology, Selçuk University Faculty of Medicine, Konya

Aim: Chronic total occlusion (CTO) percutaneous coronary intervention (PCI) is one of the most technically demanding procedures in interventional cardiology. While retrograde approaches are often employed when antegrade crossing fails, occasionally the retrograde wire cannot traverse the occlusion but can serve as a "just marker" by delineating the distal true lumen. This technique can provide essential anatomical guidance to enable successful antegrade wiring.

Case Report: A 75-year-old male with hypertension, hyperlipidemia, and prior coronary artery disease [multiple PCIs, most recently circumflex (CX) PCI] presented with multivessel coronary artery disease including a proximal left anterior descending (LAD) CTO. Coronary artery bypass grafting was recommended at an outside center but declined by the patient, and staged PCI was planned. In the first session, CX, obtuse marginal, and RCA lesions were successfully stented. In the second session, LAD CTO PCI was attempted using bilateral 7F guiding catheters. A retrograde approach via RCA septal collaterals was performed using Sion, Sion Black, Whisper, and SUOT wires. Although the retrograde wires failed to cross the CTO, they successfully reached the distal LAD and acted as a "just marker," defining the distal lumen. Guided by this anatomical landmark, antegrade crossing with a Gladius EX wire was achieved. Predilatation was followed by TAP bifurcation stenting with DES in LAD and diagonal branches. Final kissing balloon and POT were performed, achieving TIMI 3 flow without complications.

Conclusion: This case illustrates the practical value of the "just marker" technique in CTO PCI. Even when retrograde crossing fails, positioning the retrograde wire in the distal true lumen can provide crucial orientation for antegrade wiring, enabling successful revascularization in complex LAD CTO cases. In CTO PCI, even an unsuccessful retrograde attempt can serve as a just marker, guiding antegrade success.

Successful Revascularization of a Long Native RCA CTO Using a Hornet 14 Wir

Kadri Murat Gürses

Department of Cardiology, Selçuk University Faculty of Medicine, Konya

Aim: Chronic total occlusion (CTO) of the right coronary artery (RCA) remains one of the most challenging lesions in interventional cardiology. Dedicated CTO wires have been developed to overcome high resistance proximal caps and long fibrotic segments. Among these, the Hornet series (Hornet 10/14/20) is designed with high tip load, improved torque response, and tapered penetration power, allowing precise control in heavily calcified or fibrotic CTO lesions.

Case Report: A 67-year-old male with diabetes mellitus, hypertension, prior stroke, paroxysmal atrial fibrillation, and coronary artery disease (multiple PCI procedures since 2012, most recently CX PCI) was referred from an outside center after unstable angina. Angiography demonstrated a proximal RCA CTO with retrograde collateral filling from the left coronary system; prior stents were present in the circumflex artery. The patient was scheduled for RCA CTO PCI. An EBU 3.75 guiding catheter was used for left main coronary artery and an Amplatz guiding catheter for RCA. Finecross microcatheter support was provided. Initial attempts with Gaia Second, Conquest Pro 12, and Gladius MG wires were unsuccessful in crossing the lesion. The Hornet 14 wire, with its 14 g tip load and enhanced penetration force, successfully traversed the resistant proximal cap and fibrotic occlusion. Predilatation was performed, followed by drug-eluting stent implantation (2.75×48 mm, overlapped with 3.5×40 mm), and proximal optimization technique with a 3.5×12 mm NC balloon. TIMI 3 flow was achieved without complications.

Conclusion: This case demonstrates the value of Hornet 14, a high-penetration CTO wire, in achieving successful revascularization where conventional CTO wires failed. Hornet's design characteristics-high tip load, controlled torque, and tapered entry profile-make it an effective option for resistant CTO lesions in complex, high-risk patients.