9TH EDITION

MLCTO

SHARING KNOWLEDGE

MULTI LEVEL CTO ANNUAL COURSE

27TH - 29TH JUNE 2024

ACADEMY JOURNAL

JUNE 2024

HIGHLIGHTS

CO-DIRECTORS

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A CARDIOVASCULAR CONTRACT RESEARCH ORGANIZATION

Are you looking for a cardiology-focused Contract Research Organization (CRO) to support your next device study? ML CTO Academy provides a full range of clinical research services with a specialization in interventional cardiovascular medical devices.

Our strength is the ability to offer superior management services, combining operational excellence with scientific and academic leadership.

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MLCTO ACADEMY

RESEARCH • EDUCATION

Do you want to join our international scientific community? Grab a coffee and come **visit our booth!**

More than 1,500 members are already part of the ML CTO Academy.

JOIN THE ML CTO ACADEMY

WE ARE +1500 MEMBERS!

THE ML CTO ACADEMY IS AN EDUCATIONAL AND SCIENTIFIC ASSOCIATION AIMING TO IMPROVE PATIENT CARE THROUGH THE SUPPORT OF TEACHING, SCIENCE, RESEARCH, AND CLINICAL PRACTICE IN THE FIELD OF INTERVENTIONAL CARDIOLOGY, FOCUSING ON CORONARY CHRONIC OCCLUSION TREATMENT.

As for today, we observe very few thorough studies among the international CTO community, mainly due to the small number of centers included in the patient recruitment process.

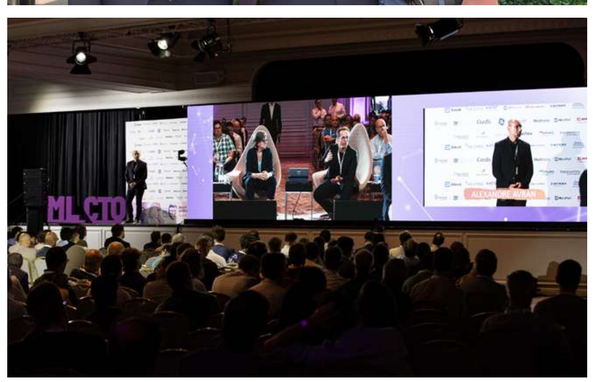
ML CTO Academy has first been created to support innovation and research.

Its main objective is to offer all members the opportunity to participate in their registries, in accordance with their national ethical committees' regulations, and to submit topics, which will be discussed and selected by the Board.

Each member can also participate and include their case data for publication purposes, and/or to present during the ML CTO Courses.

The Academy aims to improve ethical, technical, and material conditions in coronary chronic occlusion treatment to enhance patient care.

Its mission is also to provide continuing education and training for its members, with an active personal involvement and interest in CTO PCI, and to promote the exchange of ideas, experience, and information for the further direction and goals of this niche treatment.



ALL CTO OPERATORS CAN BECOME A MEMBER OF THE ACADEMY.

1.

BE PART FOR FREE

of an international scientific community dedicated to CTO PCI – with information and experience sharing, breaking news, and regular training programs.

2.

BE ALLOWED TO

submit scientific studies, related to CTO PCI.

3.

PARTICIPATE IN ALL REGISTRIES

organized and supervised by the ML CTO Academy (according to the criteria of national ethical committees).

4.

HAVE A PRIORITY ACCESS

to all ML CTO events

GUIDEWIRES & MICROCATHETERS WORKSHOP

The ML CTO Academy has launched a unique workshop to improve and discover new guidewires and microcatheters and know how to master them and for which lesions!

Twenty participants from around the world will have the opportunity to enjoy a two-day workshop designed to provide, from basic to advanced levels, practical and medical education on coronary occlusion. An opportunity to explore the many different products and techniques used in the treatment and management of CTO lesions.

Divided into small groups, participants will get a chance to use our hands-on models through a **guidewire and microcatheter simulation zone.**
This workshop is run in partnership with **worldwide experts and leading companies** in the field.

WORKSHOP DATES

The Guidewires & Microcatheters Workshop is taking place in two different dates:

1ST DATE
JUNE 26TH 2024
IN NICE (FRANCE)
BASIC/INTERMEDIATE LEVEL

2ND DATE
NOVEMBER 16TH 2024
IN PARIS (FRANCE)
ADVANCED LEVEL

PANEL OF EXPERTS

Alexandre AVRAN
Valenciennes, France

Gregor LEIBUNDGUT
Basel, Switzerland

Kambis MASHAYEKHI
Lahr, Germany

Stéphane RINFRET
Atlanta, United States

Masahisa YAMANE
Toghigi, Japan

APPLICATIONS ARE CLOSED FOR 2024.
We will call for participants in March 2025

Training Grant & Fellowship

€ 10,000

Offered by the *ML CTO Academy* *for a fellowship in a centre of excellence*

The ML CTO Academy offers a training grant of 10,000€ for a clinical fellowship in interventional cardiology.

The next call for candidate application period will run from May 1st to July 31st, 2024.

The ML CTO Academy training grant provides an opportunity for clinical training in a country other than the applicant's own. The grants are for fellows who have completed the major part of their interventional cardiology training, but have not yet obtained a post defined as 'permanent', 'senior staff', or 'consultant', and want to improve their skills and knowledge in complex interventional cardiology treatment.

The goal of this award is to help young candidates attain clinical competence and acquire experience in high-quality CTO PCI practice, which will enable them to contribute to the improvement of academic standards upon return to their own countries.

DISCOVER GUIDELINES AND HOW TO APPLY!

HOSTING CENTRE

A leader centre in interventional cardiology in France.

The Hosting Centre for the ML CTO Academy Grant 2024 will be the ICPS – l'Institut Cardiovasculaire Paris Sud (Massy, France).
A reference hospital in the diagnosis and treatment of heart diseases, leader in interventional cardiology in France. The supervisor of the fellowship program will be **Dr Thomas Hovasse**, a CTO PCI expert, part of the ML CTO Scientific Committee.

THE GRANT

This fellowship will provide 10,000 euros (12 months) **to supplement part of the salary of one fellow.**

- The 50% (5,000€) will be granted at the beginning of the fellowship.
- The remaining 50% (5,000€) will be granted at the end of the fellowship, after submitting a research paper.

A CARDIOVASCULAR CONTRACT RESEARCH ORGANIZATION

OUR ACADEMIC INVOLVEMENT AND CARDIOVASCULAR METHODOLOGICAL EXPERTISE ARE YOUR ADVANTAGE

Are you looking for a cardiology-focused Contract Research Organization (CRO) to support your next device study? ML CTO Academy provides a full range of **clinical research services with a specialization in interventional cardiovascular medical devices.**

Our strength is the ability to offer superior management services, combining operational excellence with scientific and academic leadership.

Some solutions offered by ML CTO Academy include:

- Access to some of the world's leading interventional cardiologists.
- Complete clinical registry management support: data management, statistical services, clinical research monitoring,...
- Clinical registry services to developers of cardiovascular devices: protocol development, trial design, statistical analysis,...
- Access to patients: KOLs and high-performing clinical sites, allowing for more efficient patient recruitment and retention.
- Improved outcomes: helping to ensure that the trial is designed and executed to maximize the potential for positive outcomes.

QUALITY PRINCIPLES

1. Produce high-quality clinical data

2. Conduct ethical research

3. Conduct clinical research in an efficient and cost-effective manner

4. Provide a valuable service to our members

A structure facilitating the design and conduct of *clinical registries*

This ML CTO Academy initiative between thought leaders in the field of interventional cardiology creates an opportunity for **multicenter, multinational investigator- initiated studies.** Several multicenter randomized clinical registries sponsored by ML CTO Academy are currently being conducted by means of **scientific grants from leading industries.**

JetCTO Registry

A retrospective, multi-center registry evaluating the clinical and angiographic outcome of covered stents for the treatment of coronary perforation during CTO procedures.

Coronary perforation occurring during a CTO PCI is a rare complication with potential major adverse cardiac events. The long-term clinical and angiographic outcome of such perforation that needs sealing with a covered stent, must be refined in a large international registry. The purpose of this study, sponsored by the University of Mons with an unrestricted educational grant from the ML CTO Academy, is to describe in a large international collaborative network the occurrence and outcome of coronary perforations complicating a CTO procedure.

Primary Endpoint:

To assess the long-term (≥ 6 months) clinical follow-up of patients suffering from a coronary perforation during a CTO procedure.

Secondary Endpoint:

1. Angiographic patency of any covered stent used to seal the perforation;
2. Rate of complications (composite of cardiac death, myocardial infarction, major bleeding and cardiac tamponade) of the index procedure.

HostiumCTO Registry

A retrospective, multi-center registry for the evaluation of the clinical outcome following ostial RCA CTO procedures.

The prevalence of ostial CTO lesion of the RCA is the most prevalent and constitutes an increased challenge during PCI owing to the difficult engagement of the lesion as well as the use of the retrograde approach. The long-term clinical and angiographic outcome of such lesions need to be refined in a large international registry.

Primary Endpoint:

To assess the long-term (>6 months) clinical follow up of patients who underwent a CTO procedure of an ostial RCA.

Secondary Endpoint:

1. Angiographic patency of any stent implanted during the procedure; Rate of complications (composite of cardiac death, myocardial infarction, major bleeding and cardiac tamponade) of the index procedure.

REVIEW OF
TRIALS' RESULTS

Dear friends and attendees,

Welcome to MLCTO 2024!

Can we extrapolate the results from 2 major randomized controlled trials to our angina patients with chronic total occlusions who are hoping for a solution to their symptoms?

In this section, I asked 2 of my previous fellows, now accomplished CTO operators and scientists, to give their thoughts on the applicability of 2 important trials' results, the REVIVED-BCIS2 and ORBITA-2 to the CTO population.

What do you think?
Enjoy the read!

Stéphane Rinfret, MD, SM
Co-Director MLCTO

CAN WE GENERALIZE THE REVIVED-BCIS2 TRIAL FINDINGS TO HEART FAILURE PATIENTS WITH CTOS?

Luiz F. Ybarra, MD
Interventional cardiologist,
Ontario, Canada

The REVIVED-BCIS2 trial investigated whether combining percutaneous coronary intervention (PCI) with optimal medical therapy (OMT) is more effective than OMT alone for patients with a left ventricular ejection fraction (LVEF) of 35% or less and significant coronary artery disease (CAD).1 This randomized, parallel, open-label study included 700 patients with severe left ventricular dysfunction. Participants were divided into two groups: 347 received multivessel PCI plus OMT, while 353 received only OMT. The study followed these patients for an average of 3.4 years, with a mean participant age of 70 years. Thirteen percent of the participants were female, and 39% had diabetes. Additionally, 27% had secondary prevention implantable cardioverter-defibrillators (ICDs).

Eligibility criteria for the study required patients to have an LVEF of 35% or less, extensive CAD, and viable myocardial segments in at least four dysfunctional areas. Exclusion criteria included a recent acute myocardial infarction, acute decompensated heart failure, and sustained ventricular arrhythmia within the past 72 hours. There was no requirement for the presence of inducible ischemia.

The primary outcome—a composite of all-cause mortality or hospitalization for heart failure—was similar between the two groups (37.2% in the PCI plus OMT group vs. 38.0% in the OMT alone group, p: 0.96). Secondary outcomes, including all-cause mortality, acute myocardial infarction, and LVEF at 12 months, also showed no significant differences between the groups. Notably, revascularization outcomes varied depending on myocardial viability.2 There was no association between the extent of viable myocardium and the primary outcome (HR per 10% absolute increase in viable myocardium, 0.98; 95% CI, 0.93-1.04; P=.56). In contrast, an increasing volume of nonviable myocardium was associated with a higher likelihood of the primary outcome (HR per 10% absolute increase in nonviable myocardium, 1.07; 95% CI, 1.00-1.15; P=0.048). The extent of viable myocardium did not correlate with improvement in left ventricular function at 6 months (OR, 1.01; 95% CI, 0.93-1.11; P=0.78), but larger volumes of nonviable myocardium (OR, 0.82; 95% CI, 0.73-0.93; P=0.002) and scar tissue (OR, 0.69; 95% CI, 0.56-0.84; P<0.001) were linked to a lower likelihood of improvement in left ventricular function.

The study also examined the incidence of arrhythmias and death.3 The composite outcome of all-cause death or aborted sudden death was similar between the groups (HR, 1.03; 95% CI 0.82-1.30; P=0.80). Secondary outcomes, including cardiovascular death, aborted sudden death, appropriate ICD therapy, and sustained ventricular arrhythmia, were also comparable between the groups.

Applying the findings of the REVIVED-BCIS2 trial to CTO PCI has several limitations. First, the study did not specifically address the subset of patients with chronic total occlusions, whose clinical characteristics and needs, particularly those with viable myocardium, may differ significantly. Additionally, the primary outcomes of the trial—mortality and heart failure hospitalization—might not fully capture the benefits of CTO PCI, such as symptomatic relief and quality of life improvements. Furthermore, the technical aspects and success rates of CTO PCI involve different challenges and risks compared to non-CTO interventions, and the trial does not provide specific insights into these procedural nuances.

According to the study protocol, patients with CTOs who met the inclusion criteria could be considered, provided that the PCI operators predicted a high likelihood of success. It was also recommended that these cases ideally be performed by dedicated CTO operators. Although specific outcomes for CTO PCI within the REVIVED-BCIS2 population have not been reported, it is notable that the PCI group showed significant and persistent improvements in quality of life compared to medical therapy alone. For example, the Kansas City Cardiomyopathy Questionnaire quality of life score showed improvements at 6 months, 1 year, and 2 years post-intervention, with the PCI group consistently reporting higher scores than the OMT group (Table 1).

Table 1: Kansas City Cardiomyopathy Questionnaire - Quality of Life Score:

Quality of life score	PCI	OMT	Difference in means (95% CI)
Baseline	53.7 (51.6 to 55.8)	53.7 (51.6 to 55.8)	-
6 months	70.1 (67.4 to 72.9)	62.2 (59.5 to 64.9)	7.9 (4.5 to 11.4)
1 year	69.9 (67.1 to 72.6)	64.8 (62.0 to 67.5)	5.1 (1.7 to 8.5)
2 years	70.6 (67.7 to 73.6)	66.4 (63.4 to 69.3)	4.2 (0.4 to 8.1)

Major limitations of this study are worth mentioning: first, most patient were stable and minimally symptomatic. Therefore, patients with NSTEMI presenting with heart failure who have severe 3 vessel disease with CTOs, undergoing PCI or CABG, were not represented at all. Also, presence of coronary stenoses with heart failure does not necessarily indicate an "ischemic cardiomyopathy". Indeed, patients in the study had "viable" myocardium, and the conclusion should be that medication is what is needed to improve patients' outcomes in this population. Whether patients with definitive inducible ischemia and stenoses could have derived more benefit from PCI remains unknown.

In conclusion, while the REVIVED-BCIS2 trial offers valuable insights into the role of PCI in patients with cardiomyopathy and coronary stenoses, its direct applicability to patients with CTOs with heart failure is limited. Future studies specifically targeting CTO populations are needed to fully understand the potential benefits and risks of CTO PCI in this subgroup.

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ORBITA-2 RESULTS: CAN WE APPLY THEM TO SYMPTOMATIC PATIENTS WITH CTO?

Louis Verreault-Julien, MD, MPH
Interventional cardiologist,
Georgia, United States

Percutaneous coronary interventions (PCI) in the context of chronic coronary syndrome aims at relieving symptoms of angina and improve quality of life. The Objective Randomized Blinded Investigation with Optimal Therapy of Angioplasty in Stable Angina (ORBITA)-2 was a double-blind, randomized, placebo-controlled clinical trial of angioplasty versus a sham procedure in symptomatic patients with chronic coronary syndrome and no antianginal treatment[4]. In this study, Rajkumar et al. showed that PCI was superior to placebo to treat angina caused by epicardial stenoses when performing modern PCI with physiology and intravascular imaging guidance. More precisely, it immediately reduced by half the mean daily number of angina episodes (0.3/day in the PCI group versus 0.7/day in the placebo group), with a sustained effect through the 12 weeks follow-up. Treatment with PCI also resulted in a 60 second longer time on a treadmill stress test compared to placebo.

In ORBITA-2, patients with chronic total occlusions (CTO) were excluded. Whether or not the results of the study apply to CTO is therefore unknown. Could the effect of CTO PCI be different than what was observed with non-CTO lesions in ORBITA-2? Based on prior evidence, this would be unlikely. First, the degree of ischemia related to CTOs is in general more profound than what was observed in ORBITA-2. In one series of patients, even after predilating the CTO lesions with a 1.5 mm balloon to allow passage of a physiology wire, the mean pre-PCI fractional flow reserve (FFR) of CTO lesions was 0.45 (versus 0.61 in ORBITA-2), a profound ischemic result that was independent of the size of the collaterals[5]. In this same study, however, the post-PCI FFR of CTO lesions was comparable to that of non-CTO lesions. From the FAME 1 and 2 trials, we know that the more significant the FFR is, the more symptomatic the patients are. We also know that patients with the largest increase in FFR after PCI are the ones who have the most symptomatic relief[6]. These findings were confirmed by data from the TARGET-FFR study[7]. By extrapolation, CTO PCI should therefore be associated with the largest symptomatic relief and benefits. Second, efficacy of CTO PCI for angina relief and improved quality of life is also supported from randomized data. In the EUROCTO trial, CTO PCI resulted in improvements in Seattle Angina Questionnaire (SAQ) scores in a similar magnitude to what was observed in COURAGE or ISCHEMIA[8-10]. This was despite an 86.6% success rate in the CTO PCI group, resulting in a 13.4% "crossover" rate to the medical treatment group. If the effect of CTO PCI is like for non-CTO PCI in non-sham-controlled studies, there is no reason for it to be different in a sham-controlled trial. Third, it is well demonstrated that successful CTO PCI results in improved quality of life compared to unsuccessful CTO PCI. In the OPEN-CTO registry, successful CTO PCI resulted in significant early improvement in every assessed health status domain versus unsuccessful CTO PCI[11]. Interestingly, unsuccessful CTO PCI also resulted in improved SAQ scores, to a higher degree than what was observed in EUROCTO, suggesting a potential placebo effect even of failed procedures. However, it was hypothesized that some 'investment" done during the procedure may have resulted in improved flow and therefore reduced symptoms. To this date, the comparison of successful versus unsuccessful CTO PCI is among the best evidence we have short of sham-controlled data.

Will we ever succeed in doing a sham-controlled study for CTO PCI? Such a study would provide invaluable information but is incredibly difficult to conduct. Unfortunately, the SHINE-CTO trial was stopped because of the pandemic. Patients with CTO lesions are usually very symptomatic. In fact, after undergoing a PCI, a residual CTO has been identified as a major predictor of residual angina, often debilitating[12]. Withholding potential treatment for these symptomatic patients could be difficult both from a patient and physician standpoint. We hope that the ORBITA-CTO pilot study, currently underway, will provide answers on the feasibility of a sham-controlled clinical trial[13].

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ARTICLE REVIEW

Global Consensus Recommendations on Improving the Safety of Chronic Total Occlusion Interventions

Principal author:
Arun Kalyanasundaram, MD
Interventional cardiologist, Chennai, India

Safety is of critical importance to chronic total occlusion (CTO) percutaneous coronary intervention (PCI). This global consensus statement provides guidance on how to optimise the safety of CTO) PCI, addressing the following 12 areas: 1. Set-up for safe CTO PCI; 2. Guide catheter--associated vessel injuries; 3. Hydraulic dissection, extraplaque haematoma expansion, and aortic dissections; 4. Haemodynamic collapse during CTO PCI; 5. Side branch occlusion; 6. Perforations; 7. Equipment entrapment; 8. Vascular access considerations; 9. Contrast-induced acute kidney injury; 10. Radiation injury; 11 When to stop; and, 12. Proctorship. This statement complements the global CTO crossing algorithm; by advising how to prevent and deal with complications, this statement aims to facilitate clinical practice, research, and education relating to CTO PCI.

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doi: 10.1016/j.hlc.2023.11.030

Full text sources on www.heartlungcirc.org

Navigating Challenging CTO with the APT Elong™ 2.6F Tapered Microcatheter: A case sharing

By

APTMedical

We would like to share a case performed by Dr. Zhao Yuxin, and Prof. Dr. Tang Yang. This case shows that with the help of an Elong 2.6F microcatheter (APT Medical Inc.), an RCA CTO was successfully treated.

PATIENT INFO

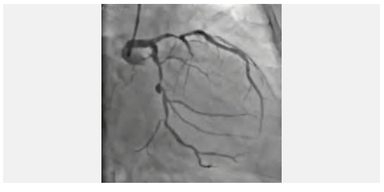
68-year-old female
Complaint: intermittent chest pain for 1 week
history : hypertension for 10 years, diabetes mellifluous for 3 years, history of hyperglycaemia for 8 years,

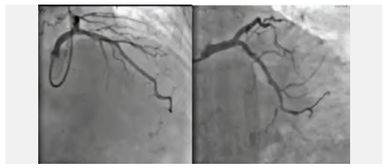
Diagnosis: Acute NSTEMI.
Angiography showed: that the coronary artery was left dominant type, the left main was normal, the proximal segment of the LAD was 80-90% stenosis, the proximal segment of the diagonal was 80% stenosis, TIMI grade 3, the middle segment of the LCX was 95% stenosis, TIMI grade 2, and the proximal segment of the RCA was 100% occluded, TIMI grade 0.

HERE IS HOW THIS CASE WAS TREATED

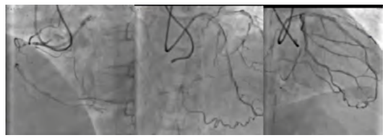
Preoperative imaging suggested 80% stenosis in the middle segment of the LAD, atherosclerosis in the proximal segment of the LCX, and 80% stenosis with aneurysm dilatation in the middle segment of the LCX.

First procedure: the operator implanted a 3.5*29mm stent in the proximal part of the LAD and a 2.75*29mm stent in the proximal-mid part of LCX by using a 6F EBU3.5.

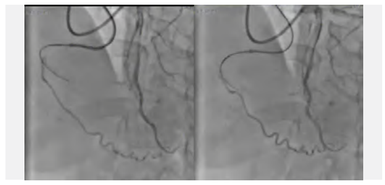




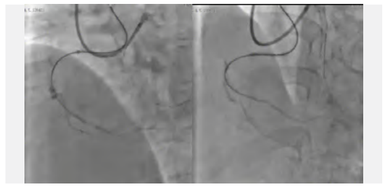
Second procedure: One week later the operator decided to manage the RCT CTO, firstly the operator performed a contralateral contrast using 6F AL 0.75+6F EBU3.5, and the Bilateral angiography showed 2 occlusions of the RCA, including occlusion of the middle RCA and the PLA openings. In addition, the distal segment of the LAD gave AM collateral circulation, and the septal gave PLA collateral circulation.



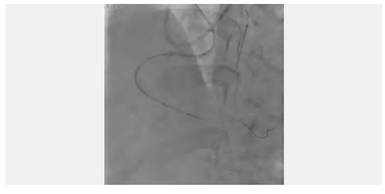
The operator decided to use the antegrade approach to cross the RCA CTO, by using the Elong 2.6F microcatheter, at first, the UB3、Gaia3 all failed to enter the true lumen of the vessel.



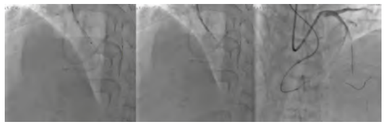
Then the CP guidewire successfully entered the true lumen of the vessel with the help of Elong 2.6F and reached the distal part of PDA.



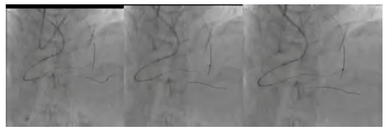
Then the Elong 2.6F rotates along the CP guidewire through the lesion to reach the PDA, and the operator changes the guidewire to Sion.



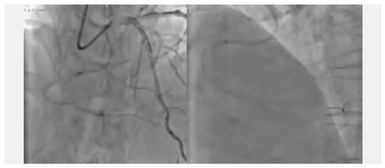
To keep the position of the guide wire inside the PDA, the operator used the trapping balloon to withdraw the Elong 2.6F and exchange it to a dual-lumen microcatheter to assist the XT-A guidewire to enter the PLA and cross the proximal occlusion of PLA.



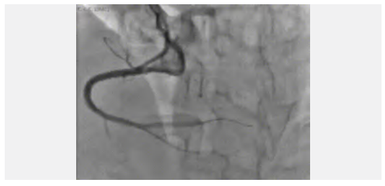
A Trapping balloon was applied to retrieve the dual-lumen microcatheter at 6F AL 0.75 GC to avoid displacement of the guidewires within the PDA and PLA, respectively.



The operator then delivered the Elong 2.6F microcatheter along the XT-A guidewire and then exchanged it for a Sion blue guidewire, and implanted 2.5*36mm, 3.0*36mm, and 3.5*29mm stents.



Final result, RCA blood flow recovered , TIMI grade 3.



In summary, after the guidewire has passed through the CTO lesion, if the conventional microcatheter and 0.75mm balloon cannot pass through the occluded segment, the APT Elong 2.6F Microcatheter can be applied. The Elong 2.6F Microcatheter features a long, tapered tip and a braided metal & stainless steel coil design that can be rotated forward, the excellent trackability and support make the Elong 2.6F an optimal choice for calcified lesions.
Besides, Elong 2.6F combined with Trapping balloon, can enhance the successful rate for the complex PCI and CTO lesions.

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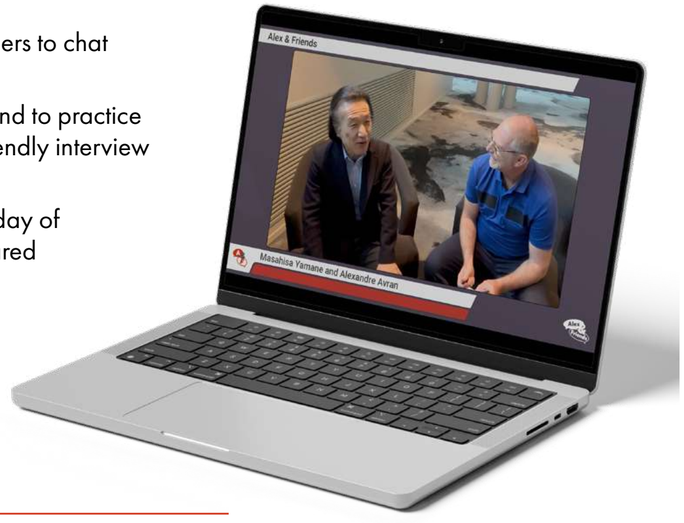

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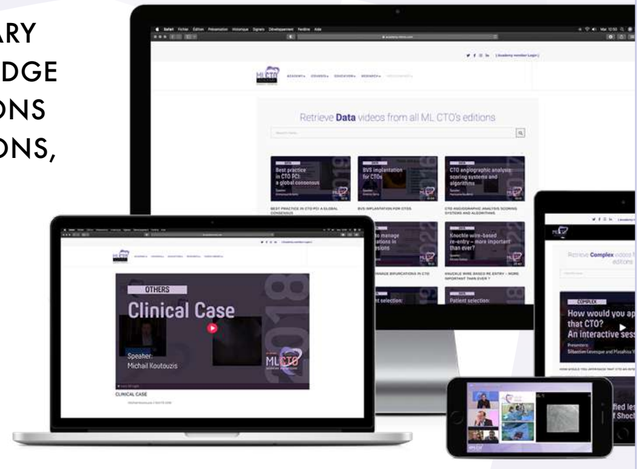

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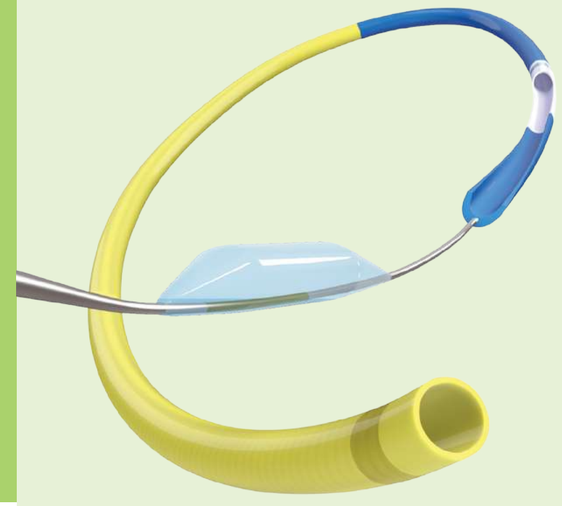

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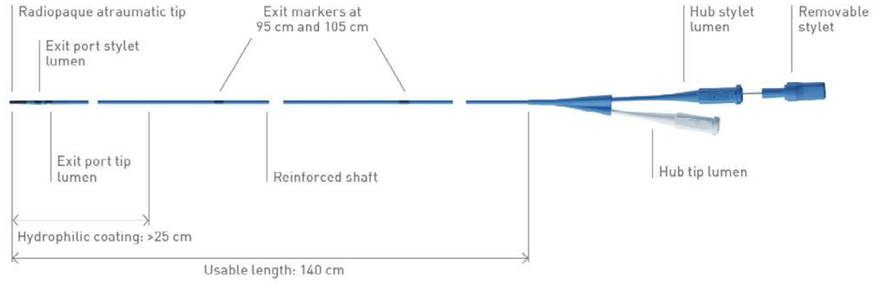
RECROSS
OTW DUAL LUMEN MICROCATHETER with 3 EXIT PORTS

By Alexandre AVRAN, Interventional cardiologist, CH Valenciennes, France

Patients' complexity, lesions' complexity, available devices and equipment, economic negotiations... the management of complex lesions has become daily life for interventional cardiologists. We must learn to manage challenges, to improve our practice while taking into account the time and cost of our procedures. And if the workshops or proctoring contribute to our improvement of our performances, we also expect from manufacturers devices which contribute to this.
ReCross market arrived on the market a couple of years ago and is still a new unique OTW double-lumen catheter with 3 exit ports.



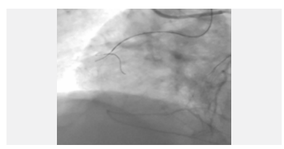
Special Features

The ReCross indeed has a certain number of characteristics which make it a unique device currently on the market, notably the presence of 2 separate OTW lumens with 3 distinct exit ports.

The tip lumen (white hub) is associated with two exit ports to be chosen alternatively:
- A distal exit port (no.1)
- A lateral exit port (no.3)

The stylet lumen (blue hub) is associated with side exit no.2 opposite side no. 3 exit

In comparison with other dual lumen catheters currently on the market, Recross particularity is, therefore, the absence of any monorail lumen and the 3 exit ports allowing for the exchange of both guide wires at any time.



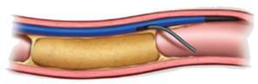
This characteristic allows the operator greater freedom of guide exchange, to multiply strategic choices during the procedure: management of bifurcations, "parallel wire" technique, anchoring in a side branch to increase push and support of the CTO guide wire into the proximal cap, tip injection in one or other of the two channels if necessary.

This also allows transforming Recross, after removal of the lateral guide wire, into a classic single-lumen microcatheter with a very good profile.

Traditional (RX/OTW) dual-lumen catheters cannot achieve this result:
- they are not able to go beyond the bifurcation because of the monorail guide wire
- the CTO lateral guide wire is losing support after proximal cap penetration.

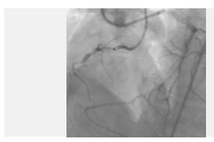
Recross low profile also allows trapping and routine use into a 6F guiding catheter.

Some interventional cardiologists are also using it as a reentry system in case of a subintimal guide close to the lumen using one or other of the lateral ports.



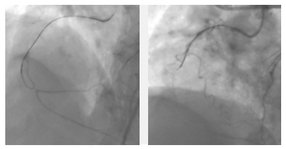
Clinical case example of RECROS as a 1st line workhorse catheter

Patient and lesion description:
- 67-year-old patient with lower ischemia related to chronic occlusion of the right coronary artery.
- CTO of the middle segment of the right coronary artery with blunt stump opposite to the start of a marginal branch
- Left-right collaterality via septal vasculature.
- Distal cap is located at the level of the crux close to CD3 without healthy landing zone.

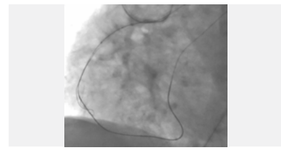


Patient preparation:
- AL 0.75 6F guiding in right radial engaged in the RCA.
- EBU 4.0 7F guiding in right femoral for the left coronary artery with the aim of an antegrade strategy with penetration of proximal and retrograde caps by "Reverse cart" technique.

Procedure :
- Antegrade use of a ReCross dual-lumen microcatheter (BIOTRONIK/IMDS) on a Sion Blue guide wire (Asahi) into white hub lumen and use of a Sion Blue guide wire (Asahi) through the blue hub lumen (single n°2 lateral port) positioned in the marginal branch.
- Advancement of the ReCross with its tip in direction of the proximal cap.
- Insertion into white hub lumen (with distal and lateral exit ports) of a Gaia 3 (Asahi) penetration guide wire and exit through distal tip.

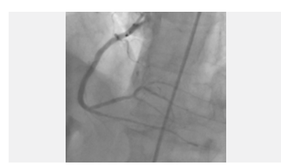


- Once the CTO guide wire is advanced into the body of the occlusion, the marginal guide wire is withdrawn into the catheter and the ReCross is advanced like a standard single-lumen microcatheter.
- Progression of a Fielder XT (Asahi) in knuckle to reach the distal cap.
- Retrograde passage via septal route with a Sion black (Asahi)
- Retrograde distal cap puncture with a Gaia 3.



- Optimal positioning of the anterograde and retrograde guide wires to perform a "reverse cart", facilitated by the placement of a Guidion guiding catheter extension (BIOTRONIK/IMDS) in the right coronary artery to help with the connection and externalization of a RG3 (Asahi).
- Reuse of the ReCross in dual-lumen mode on the RG3 (Asahi) through distal port and placement of a Sion guide (Asahi) in the RVP branch through the lateral port of the ReCross to preserve the PDA (posterior descending artery) / RVP (posterior ventricular branch) bifurcation.

Final result of percutaneous coronary intervention after implantation of 3 Orsiro Mission drug eluting stents (BIOTRONIK)



Conclusion:
The ReCross is truly unique tool combining a good low profile antegrade microcatheter with a dual-lumen catheter or a reentry system.
Its easy and intuitive use thanks to its two OTW ports and its compatibility into 5F and 6F (for trapping) guiding catheters allow successful CTO procedures without multiplying the number of devices used.

NEW PODCAST!

先SENSEI
生LEARN
CTO+Complex PCI

Insights on how to learn CTO and complex PCI by experts from around the world

By Emmanouil Brilakis, MD
Interventional cardiologist,
Minneapolis, United States

I came up with the idea of the Sensei podcast while reading the book "Tribe of mentors". In this book Tim Ferris sent an identical set of 11 questions to "some of the most successful, wildly varied, and well-known people on the planet with Answer your favorite 3 to 5 questions . . . or more, if the spirit moves you". Many people answered providing highly insightful and useful answers to me and the readers of the book.

I decided to call the podcast **"Sensei" because this is how the Japanese address the expert CTO operators.** Japan is where many of the advanced techniques in CTO PCI originated, such as the retrograde approach. Sensei means teacher or master. The term "Sensei" conveys to me a sense of respect and appreciation.

I have 2 main goals for the Sensei podcast: **learn and inspire.** Learning is one of the key – if not "the key" – goals and privileges of life and a profound source of joy and fulfillment. There are many "ingredients" for learning but 2 crucial ones are: the teacher and the motivation. The Sensei participants are highly accomplished and provide practical insights on "how they did it". Their response to challenges and setbacks has been very motivational for me and others, as it shows that with hard work and determination can "push through" almost anything.

Some of the questions I ask in the Sensei podcast came out of Tim Ferris' list:

1. ***What is the book (or books) you've given most as a gift, and why? Or what are one to three books that have greatly influenced your life?***
2. ***How has a failure, or apparent failure, set you up for later success? Do you have a "favorite failure" of yours?***

Some other questions, such as "how many hours do you sleep" came out from recent work on the physician "burnout" epidemic. Some other questions, such as "what are you most proud of" probe into the participants' motivation and sense of accomplishment.

Getting the Sensei podcast off the ground was a huge learning for me. I watched countless videos and read many articles. I learned how to find people to create a logo. I created an "intro" and "outro". I found and learned how to use online platforms for recording the podcast. I bought a zoom recorder (which I only used in the first podcast) and a fancy camera and eventually wireless mics as well as lighting. I learned how to edit the videos and how to post them in youtube and spotify. And I learned how to make this work within a quite busy schedule.

I am most grateful to the 135 people who have so far been on the podcast. I have personally learned a lot from each one of them and continue to be inspired to learn more and improve. My hope is that the Sensei podcast will inspire and help others learn.

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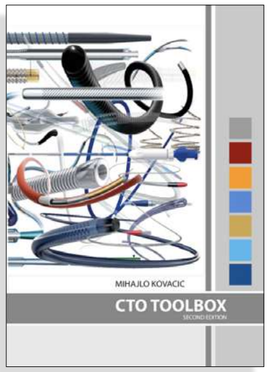
The ML CTO Academy Library is a learning space to assist practicing and trainee interventional cardiologists in a wide variety of CTO techniques. Operators can download our selected resources to become confident in applying these methodologies into their day-to-day clinical practice!



CTO Toolbox

Coronary Chronic Total Occlusion PCI devices

Construction

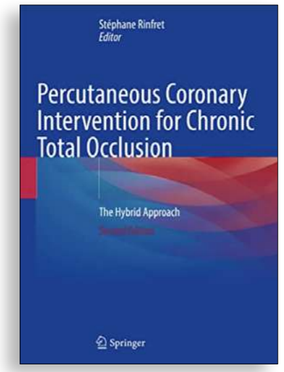
Purpose

Tips & Tricks

Mihajlo KOVACIC

When a skilled operator knows exactly what has to be done in the procedure, with the best material for that particular step, due to advanced knowledge of the construction and purpose of the devices...

The complex procedure will be done with a high rate of success and a small chance for complication, even if the very procedure was never done before by the operator.



Percutaneous Coronary Intervention for Chronic Total Occlusion

The Hybrid Approach

Stephane RINFRET

This essential text provides readers with a detailed guide to performing various percutaneous coronary intervention (PCI) techniques for treating coronary chronic total occlusion (CTO). PCI continues to be an effective procedure to help patients with this pathology, with high success and low complications rates. Chapters feature a step-by-step approach to relevant techniques and describe their potential pitfalls, enabling the reader to develop a thorough understanding of how to perform those procedures successfully. Details of the latest methods for angiography analysis and the management of ostial CTOs, plus heavily revised chapters on topics such as contemporary device-based antegrade dissection and the retrograde approach through septal and non-septal collateral channels ensure that this Work remains the most up-to-date reference on the subject.

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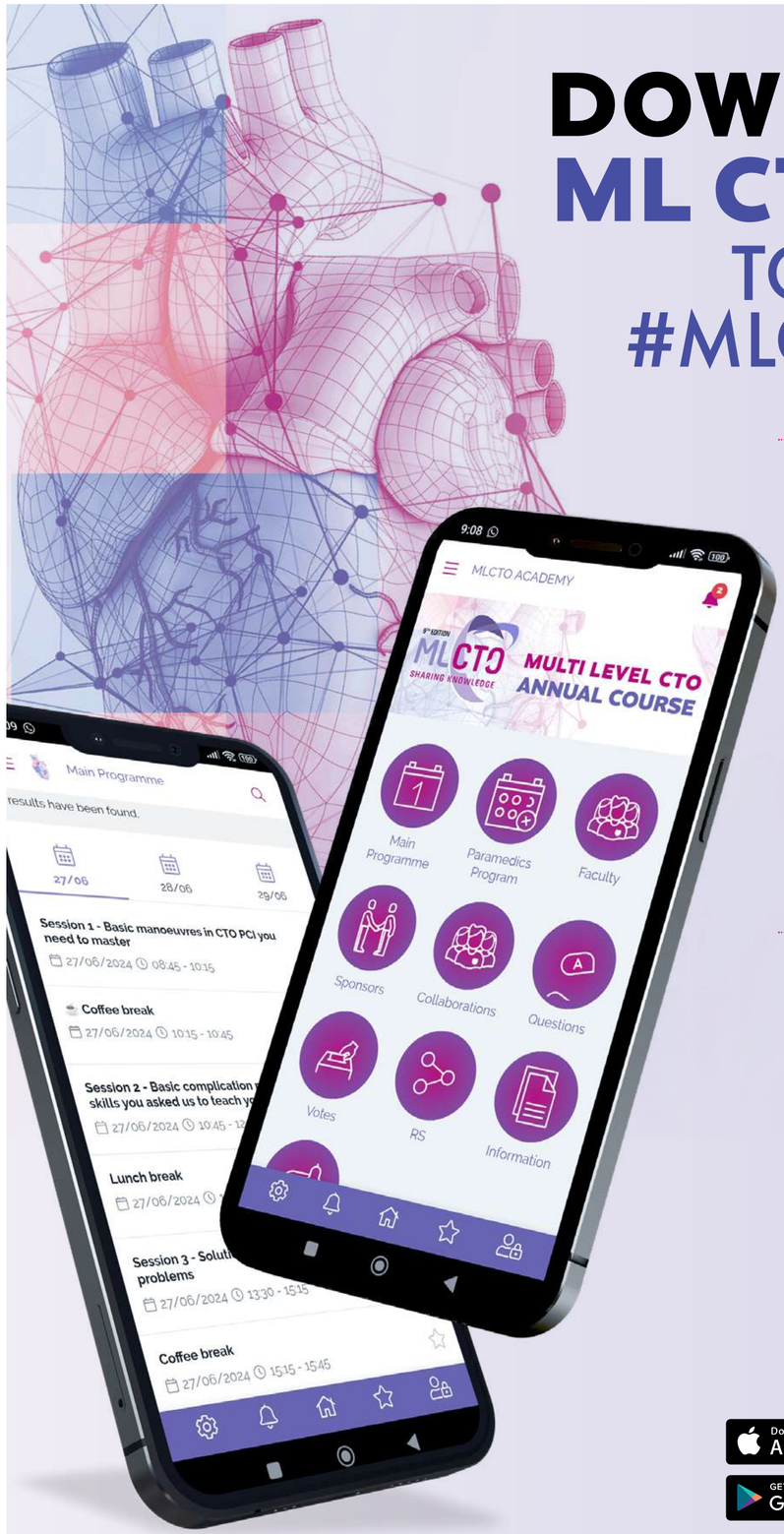

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