

CTO PCI in CHIP: What's the Difference?

Yue Li, MD

The First Affiliated Hospital of Harbin Medical University, China

Disclosure

- *Do* NOT have a financial interest/ arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.

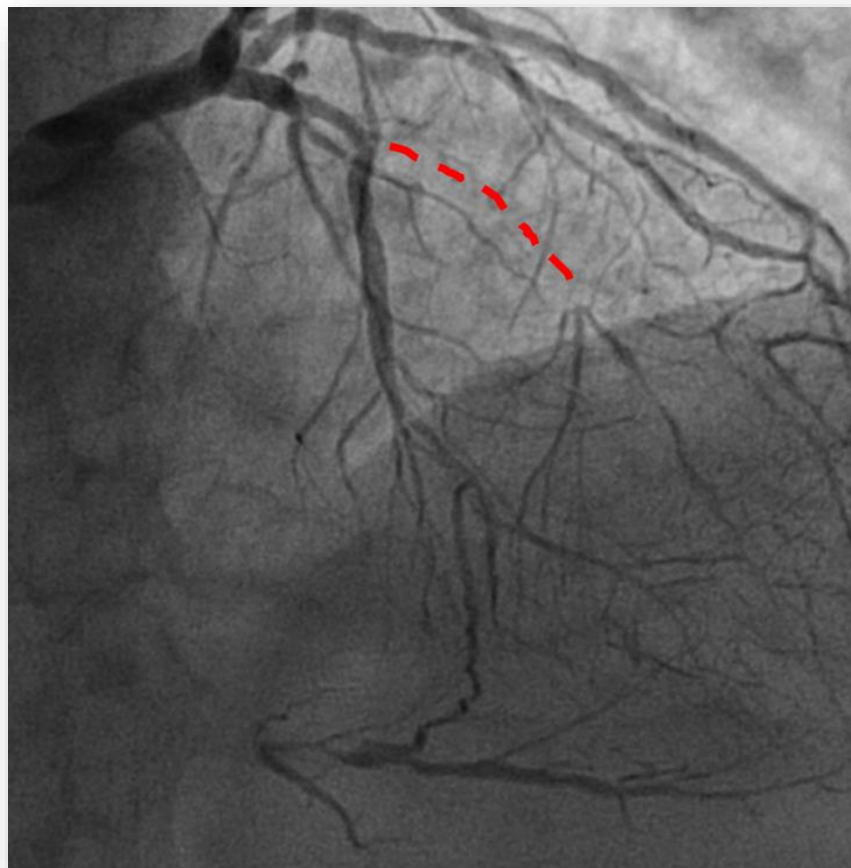
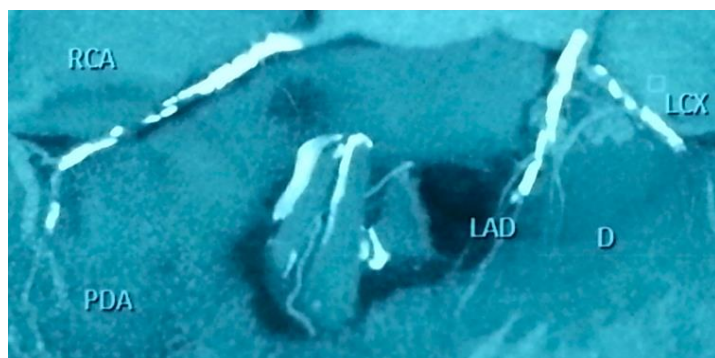
What's the difference between CHIP-CTO and "normal" CTO?

(Complex high-risk and indicated patients)

Lesion Complexity

1. Calcification
2. Proximal cap ambiguity
3. Tortuosity
4. Bifurcation at Proximal or Distal cap

.....



Patient risk

1. Age >80
2. Female
3. Low EF
4. Renal failure

.....



Sex differences in high-risk but indicated coronary interventions (CHiP): National report from British Cardiovascular Intervention Society Registry

- ◆ In this national analysis of CHiP procedures (141,610) over 12 years, there were **significant sex differences** in the type of CHiP procedures undertaken
- ◆ **Females had higher** OR for mortality, bleeding, and MACCE compared to males.

Catheter Cardiovasc Interv. 2022;1–10

TABLE 3 Adjusted odds of adverse outcomes post CHiP in patients with stable angina (reference, males)

	Odd ratio	95% confidence interval	p value
Death	1.78	1.4–2.2	0.001
Bleeding	1.99	1.72–2.30	0.001
MACCE	1.23	1.09–1.38	0.001

Current Atherosclerosis Reports (2018) 20:60
<https://doi.org/10.1007/s11883-018-0760-8>

WOMEN AND ISCHEMIC HEART DISEASE (A. MARAN, SECTION EDITOR)



Sex-Based Differences in Chronic Total Occlusion Management

Amy Cheney¹ · Kathleen E. Kearney¹ · William Lombardi¹

Curr Atheroscler Rep. 2018;20(12):60

Collateral vessels in women appear to be **smaller, more tortuous**, and **more difficult to cross**, leading less frequently to successful retrograde approaches.

Article

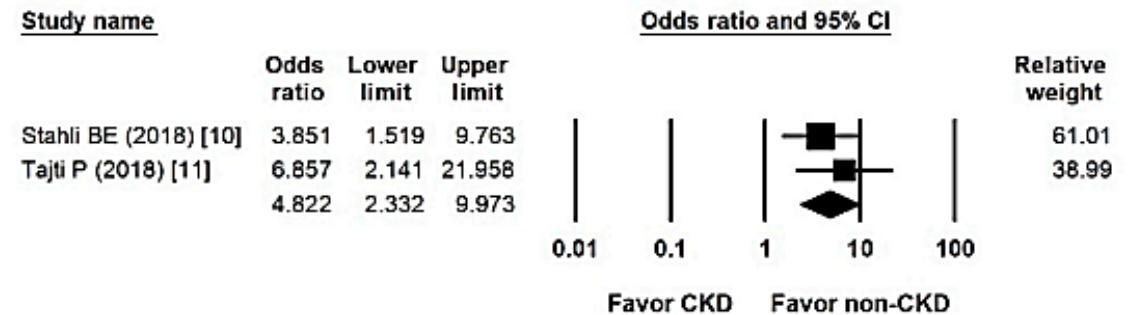
Impact of Chronic Kidney Disease on Chronic Total Occlusion Revascularization Outcomes: A Meta-Analysis

Wei-Chieh Lee ^{1,2,*}, Po-Jui Wu ¹, Chih-Yuan Fang ¹, Huang-Chung Chen ¹, Chiung-Jen Wu ¹ and Hsiu-Yu Fang ¹

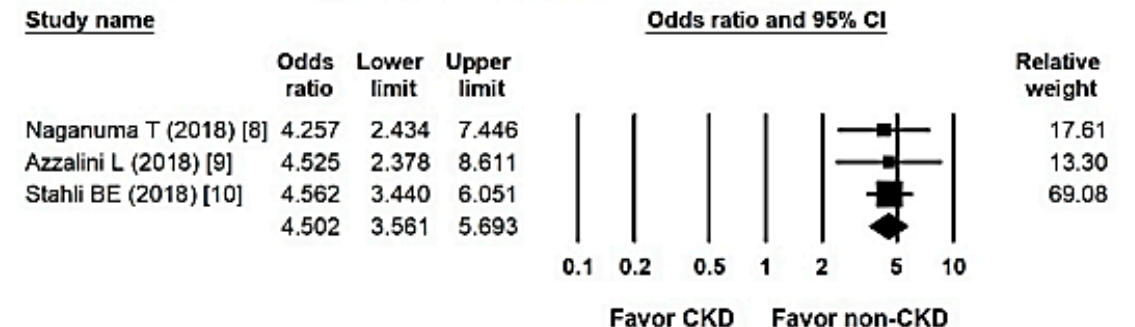
J. Clin. Med. 2021, 10, 440

- Six studies were included
- In the CKD CTO PCI population, a **lower procedural success rate**, a higher incidence of CIN or AKI, and **higher in-hospital and long-term mortality rate** were noted

A. Pooled ORs of in-hospital mortality rate



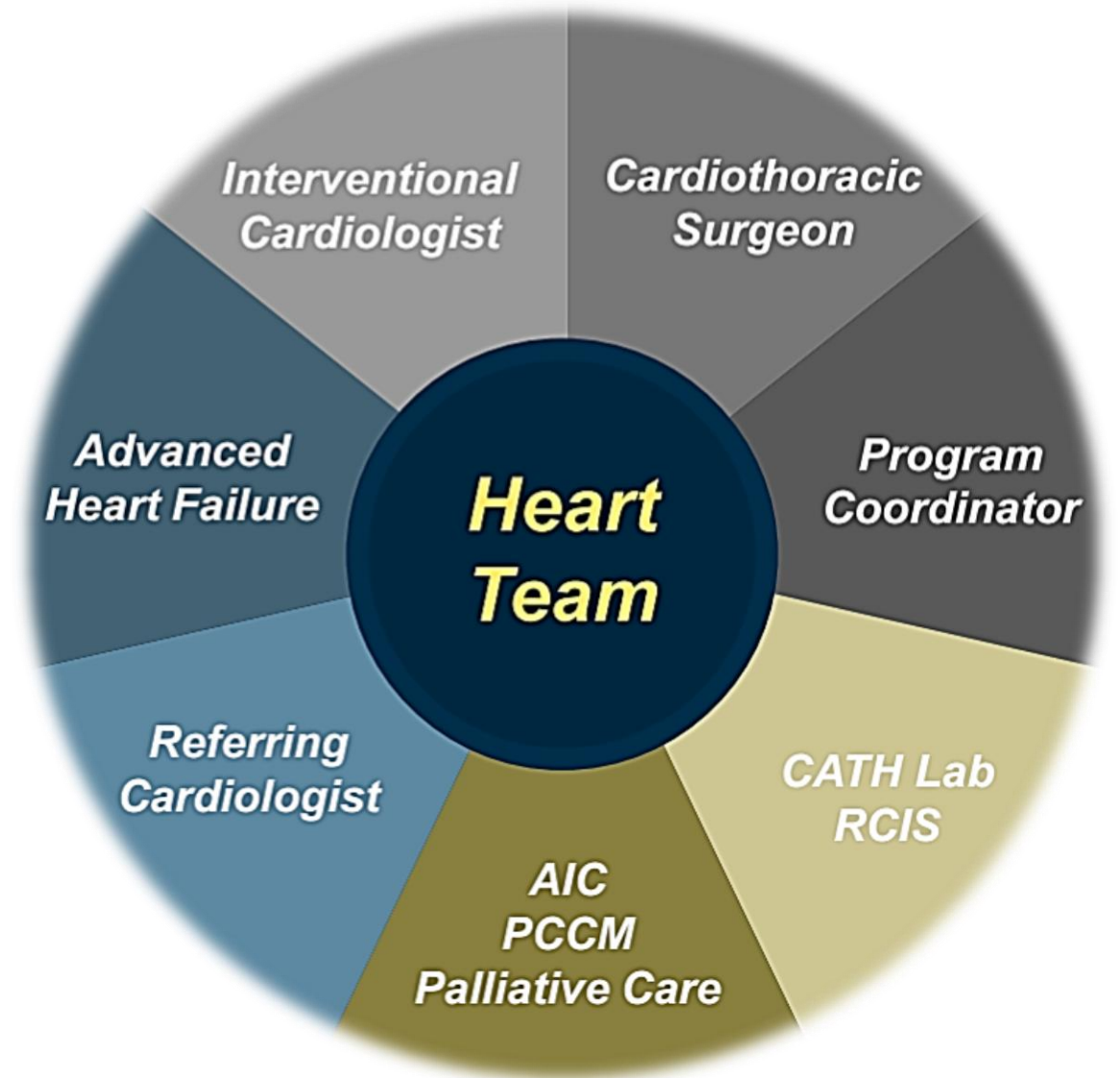
B. Pooled ORs of long-term mortality rate



What's the difference in treatment between
CHIP-CTO and “normal” CTO?

Building the CHIP heart team

- CHIP Interventionalist
- Cardiothoracic Surgeon
- Patients Primary Cardiologist
- Structural Heart Interventionalist
- Advanced Heart Failure Specialist
- Vascular Surgeon
- Electrophysiologist
- Critical Care Cardiac Intensivist
- Multimodality Imaging Specialist



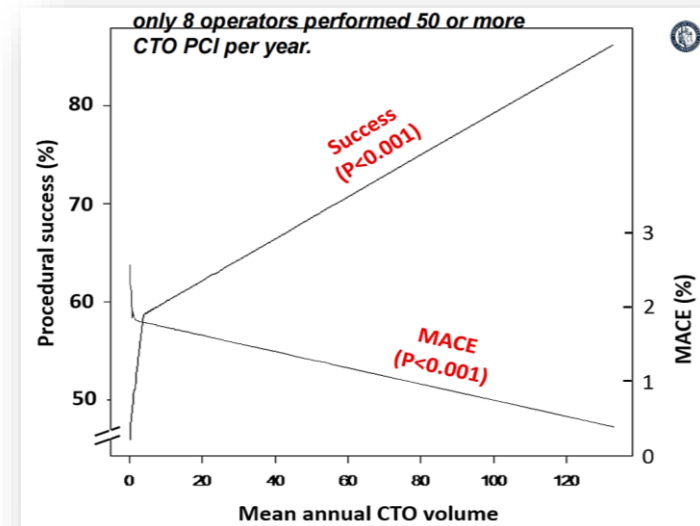
PCI volume influence on CTO PCI success

Outcomes of Percutaneous Coronary Interventions for Chronic Total Occlusion Performed by Highly Experienced Japanese Specialists

The First Report From the Japanese CTO-PCI Expert Registry

JACC Cardiovasc Interv. 2017;10(21):2144-2154

CTO-PCI performed by highly experienced specialists achieved a high technical success rate.



CHIP-CTO operator should be a Hybrid operator !

Safety and Efficacy of the Hybrid Approach in Coronary Chronic Total Occlusion Percutaneous Coronary Intervention: The Hybrid Video Registry

Catheter Cardiovasc Interv. 2018;91:175-179

- ◆ In a real world angiographic registry of complex CTOs, the Hybrid approach to CTO-PCI **is superior to** other contemporary approaches to CTO intervention
- ◆ The Hybrid Approach was associated with **shorter procedure times and lower contrast utilization.**

- ◆ Overall procedural success was **95%** of all cases attempted with an excellent safety profile.
- ◆ In the most complex lesion subset, which made up 45% of all cases, success was **92.8%**, which was significantly higher than either the Royal Brompton (78.9%), or Japanese-CTO (73.3%) registries.



Contents lists available at ScienceDirect

Cardiovascular Revascularization Medicine



Further validation of the hybrid algorithm for CTO PCI; difficult lesions,
same success ☆☆☆



Cardiovasc Revasc Med. 2017;18:328-331

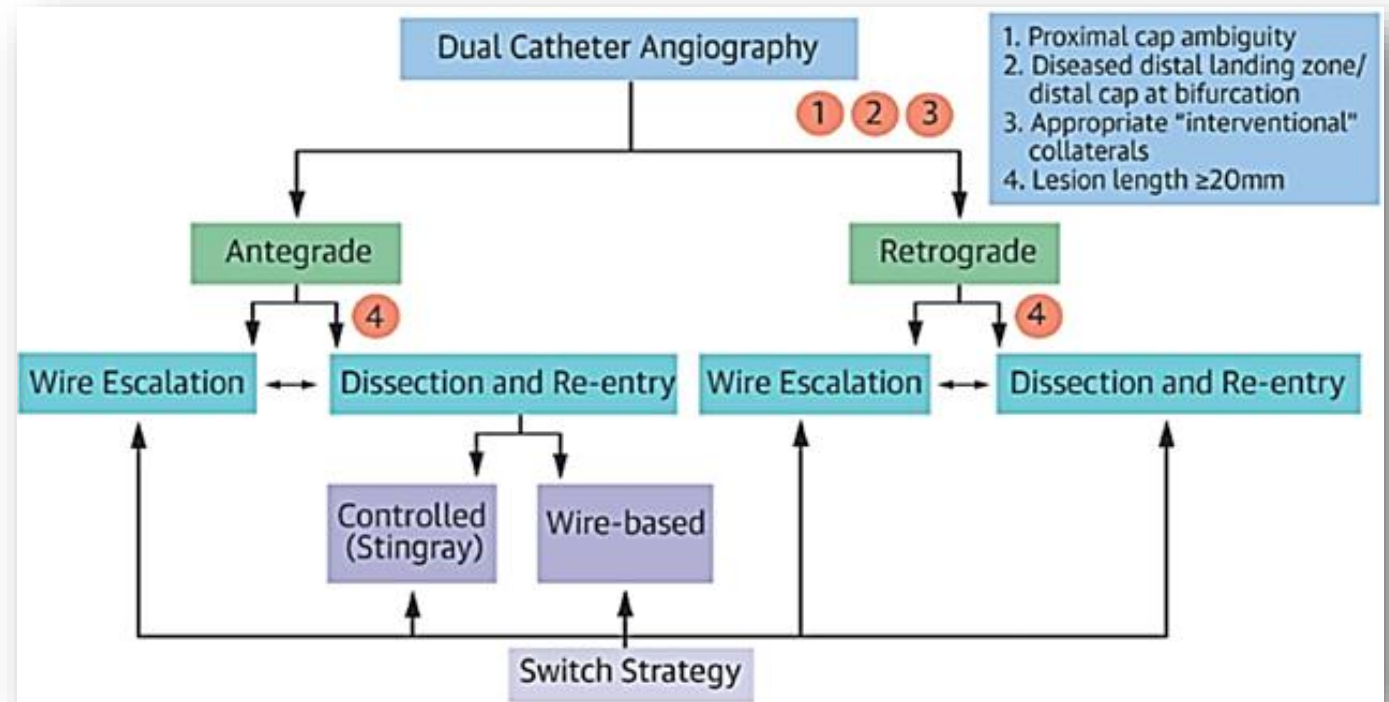
Conclusions:

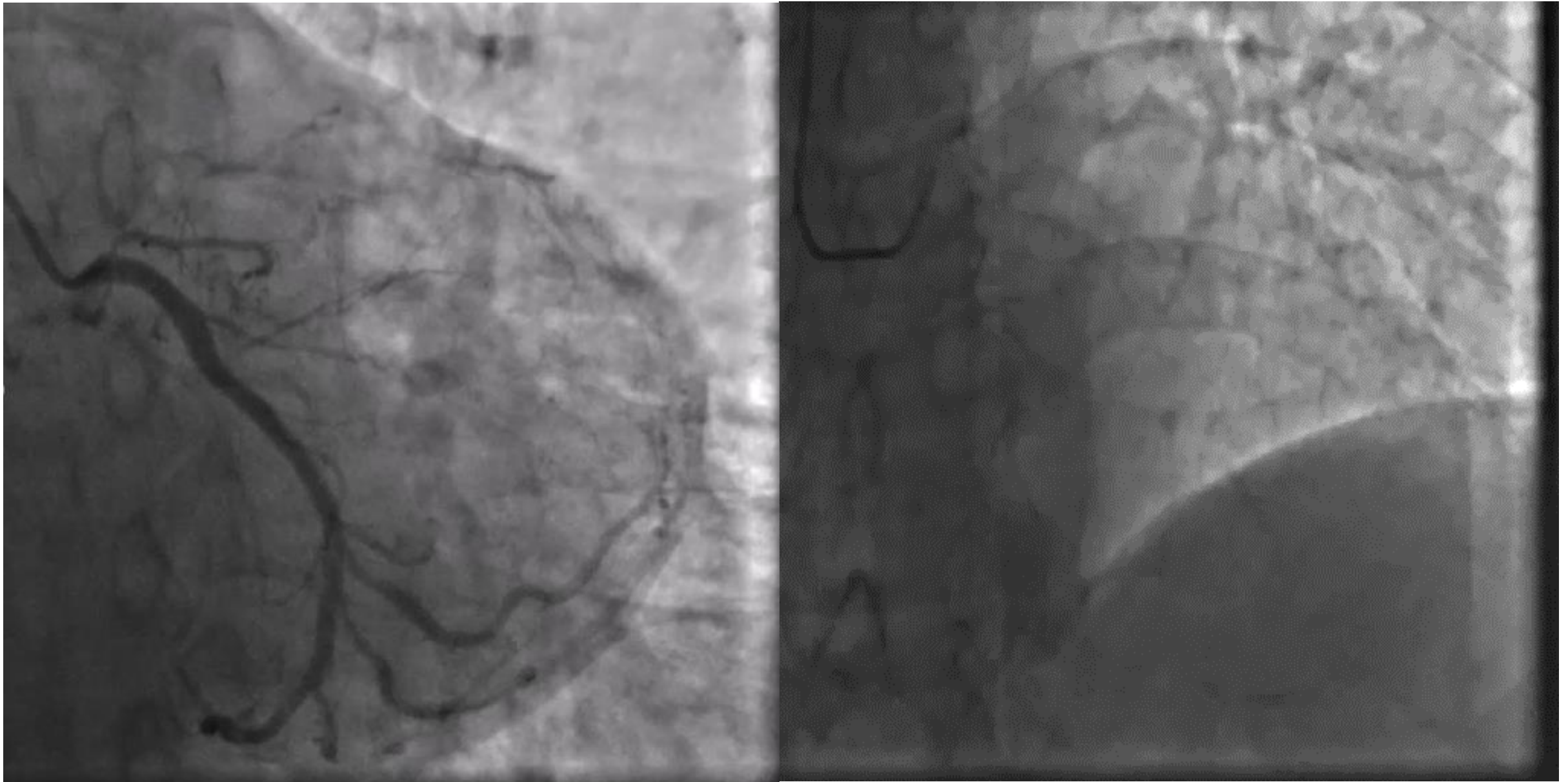
In spite of higher lesion complexity, use of the hybrid algorithm for

CTO PCI enabled **similarly high technical and procedural success rates**

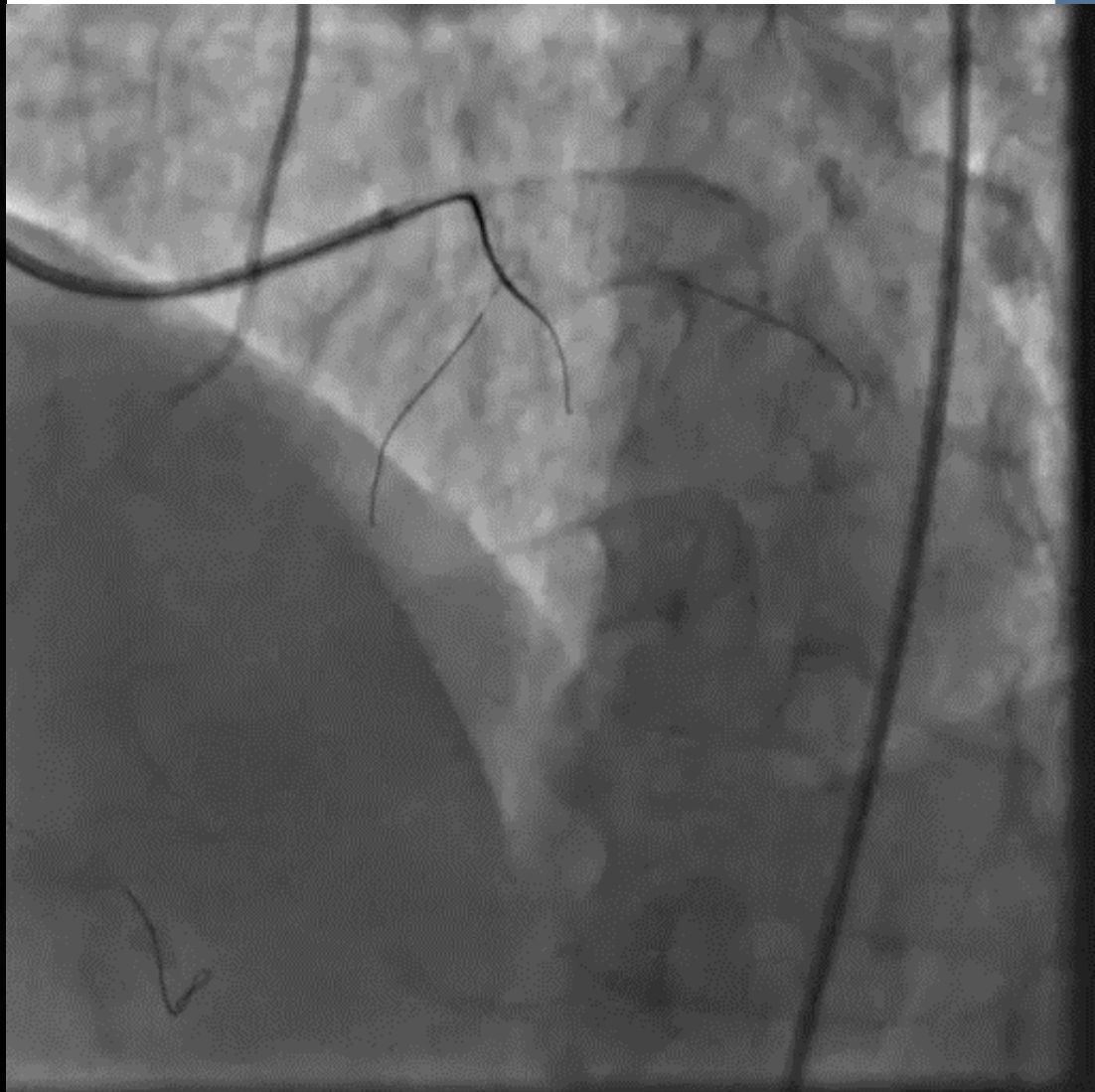
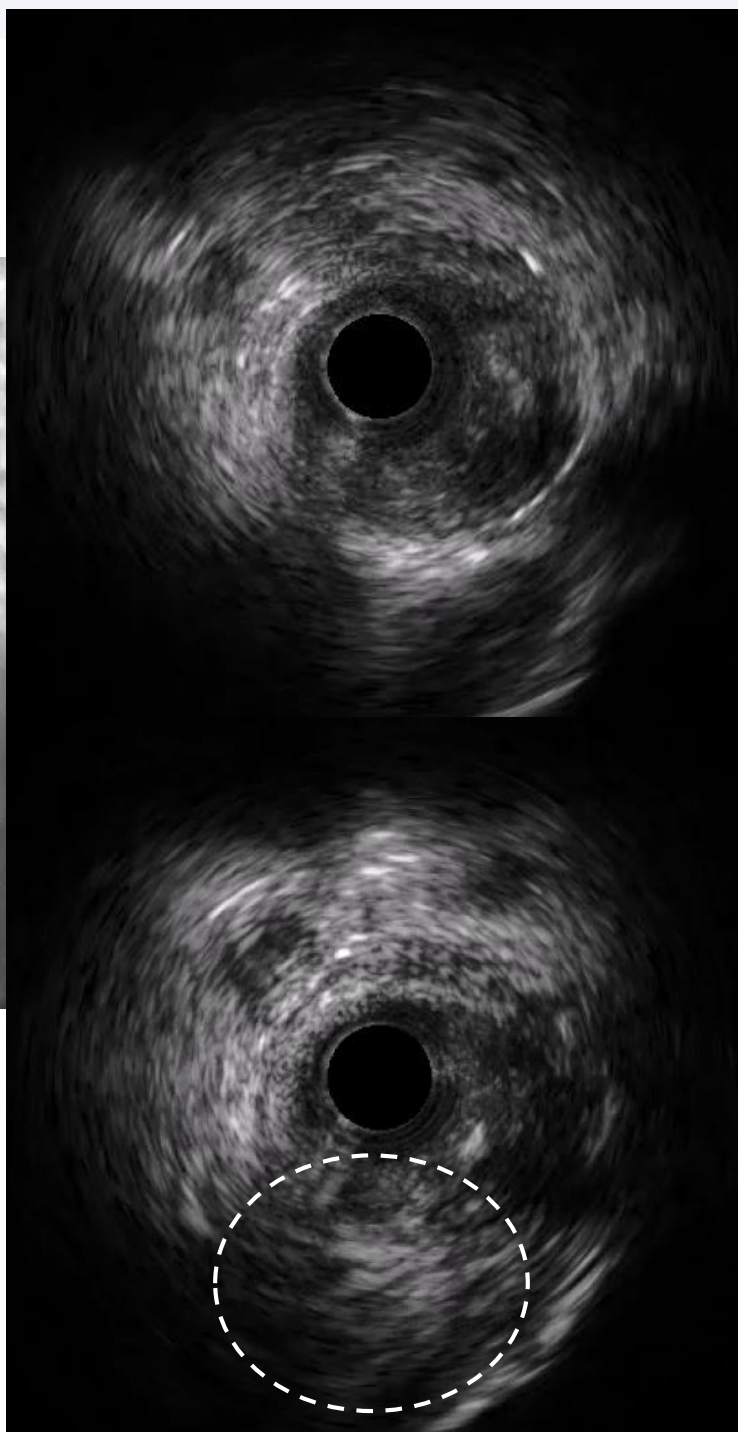
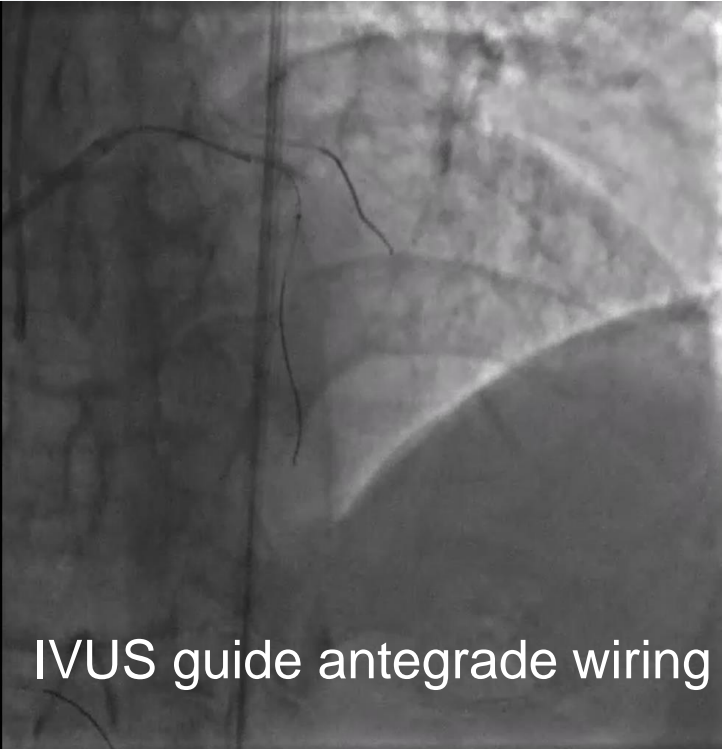
How to become a Hybrid operator ?

- ◆ Master all of the skill sets of CTO PCI, and making it reproducible and teachable.



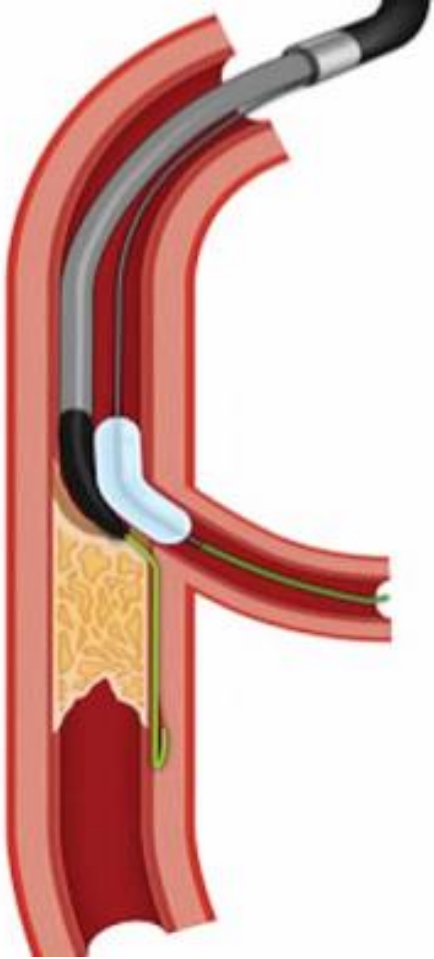


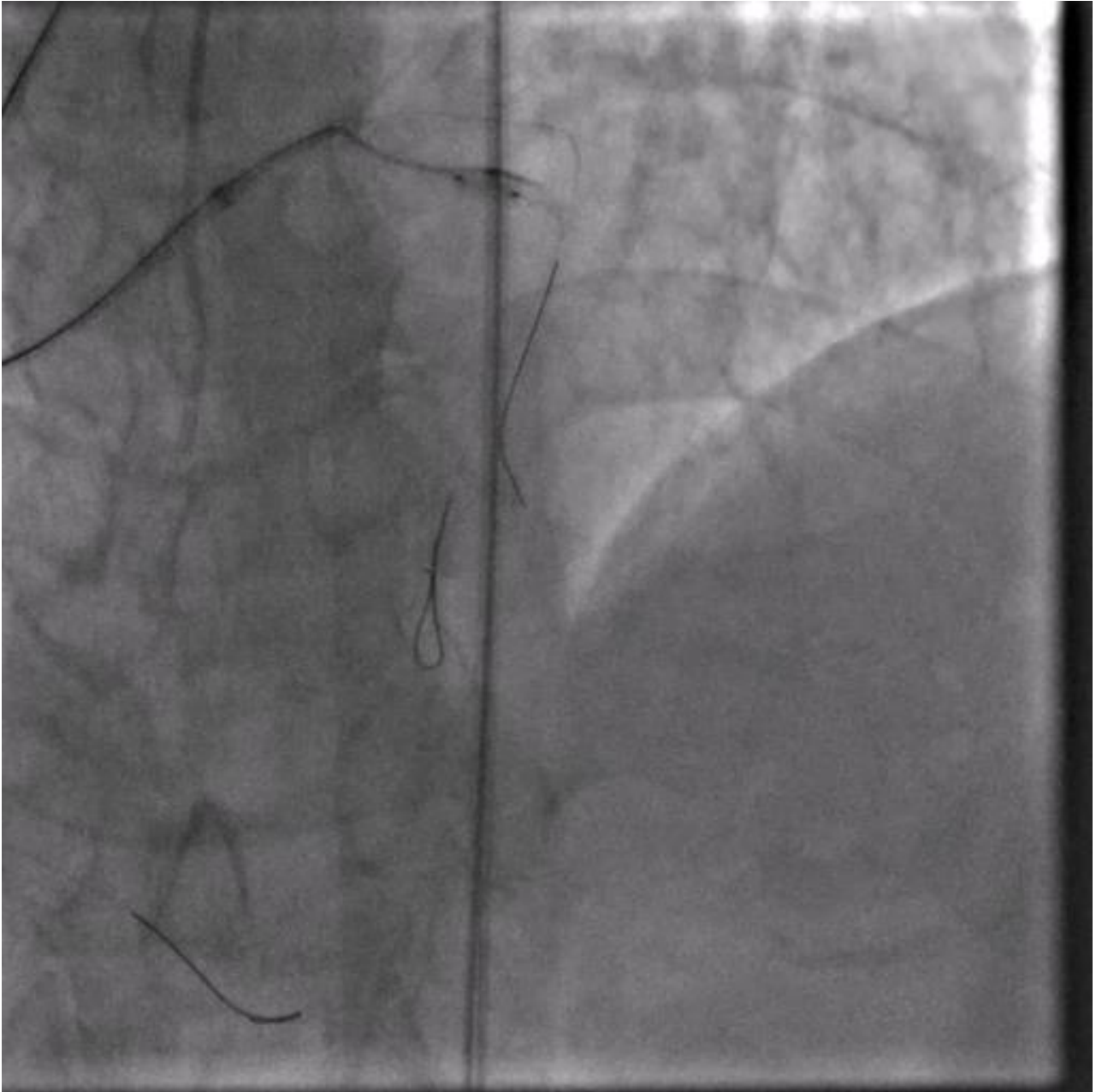






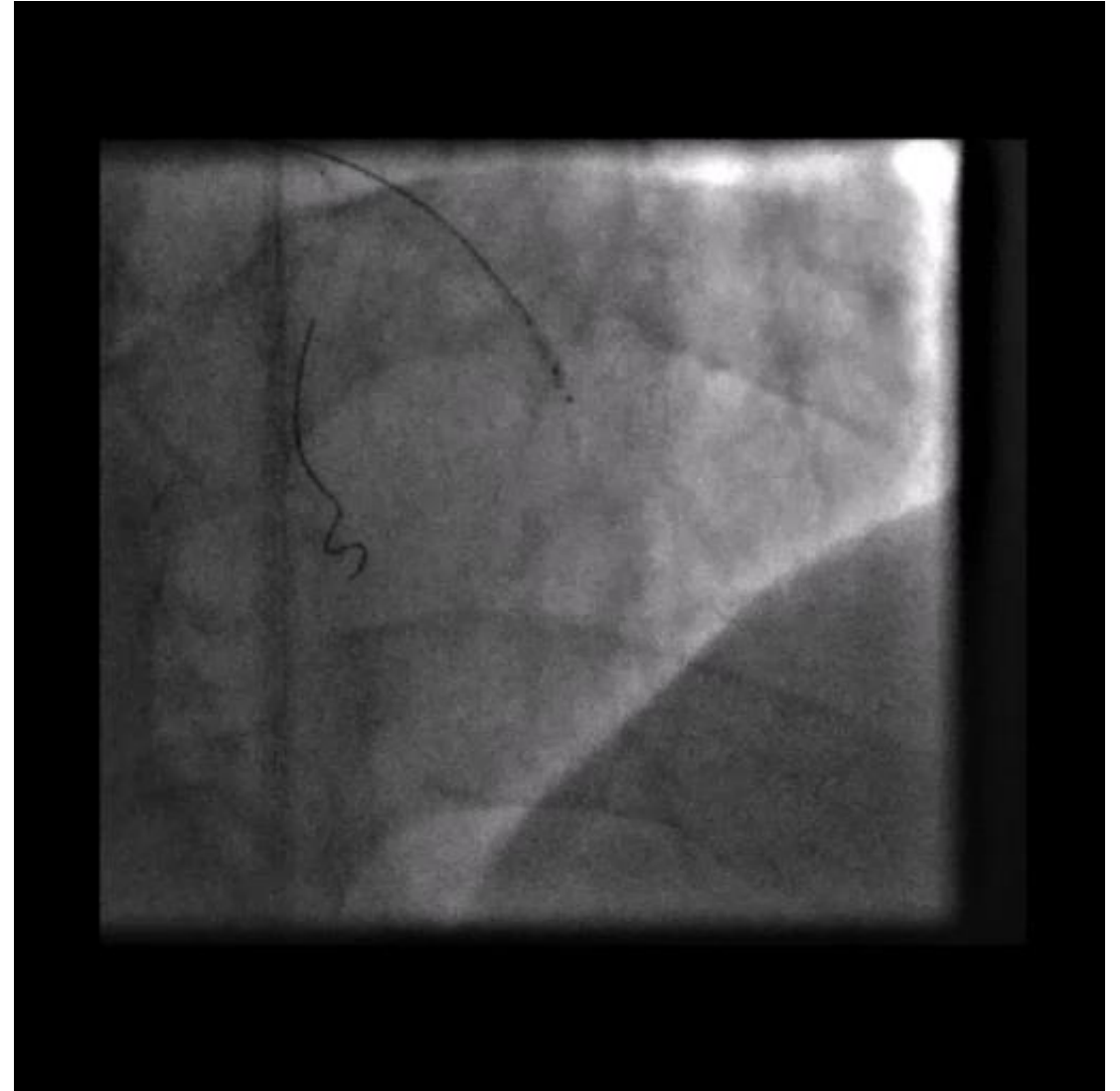
Side BASE technique

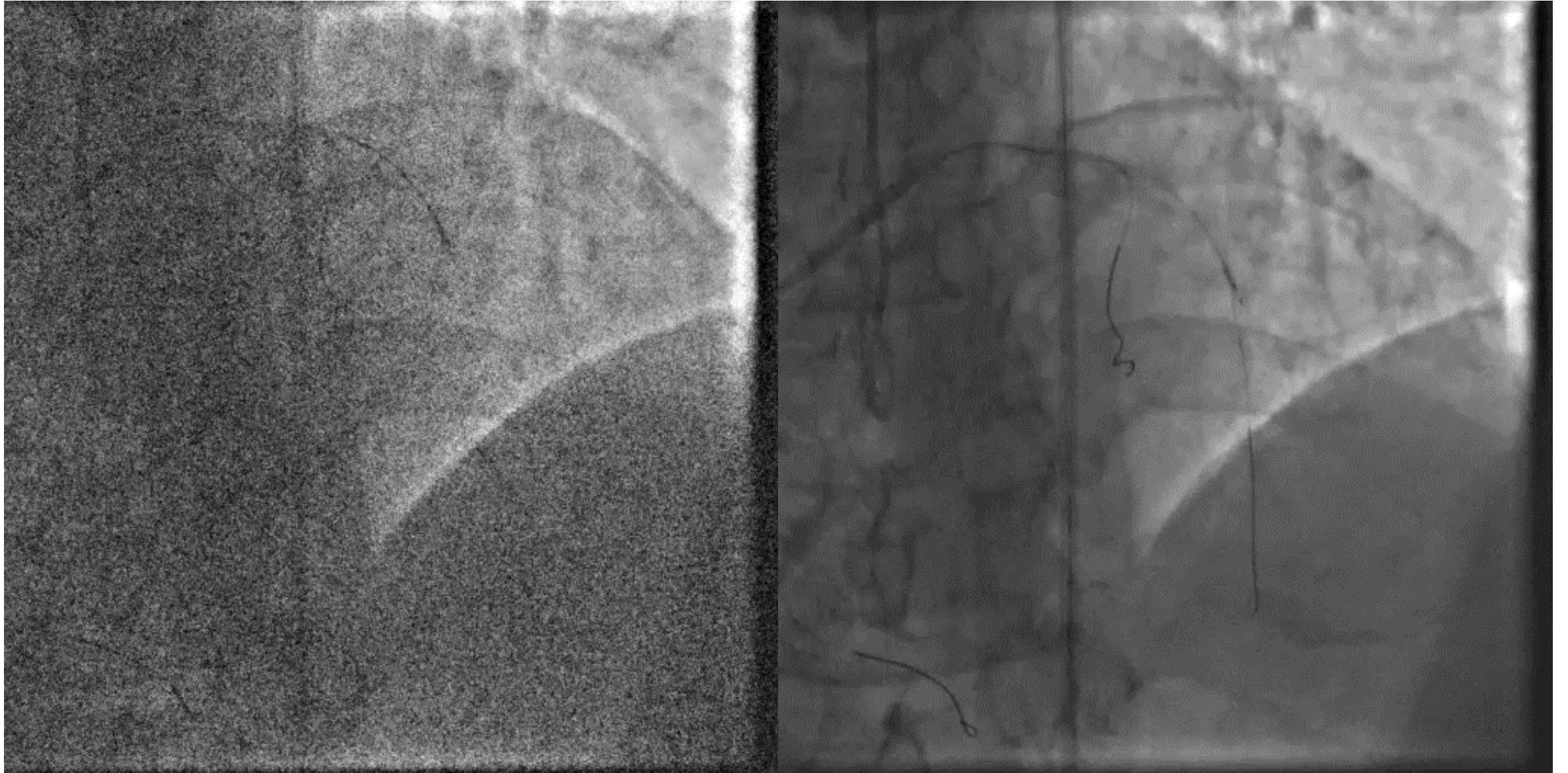




Power knuckle technique

◆ Finishing with the Corsair - ADR

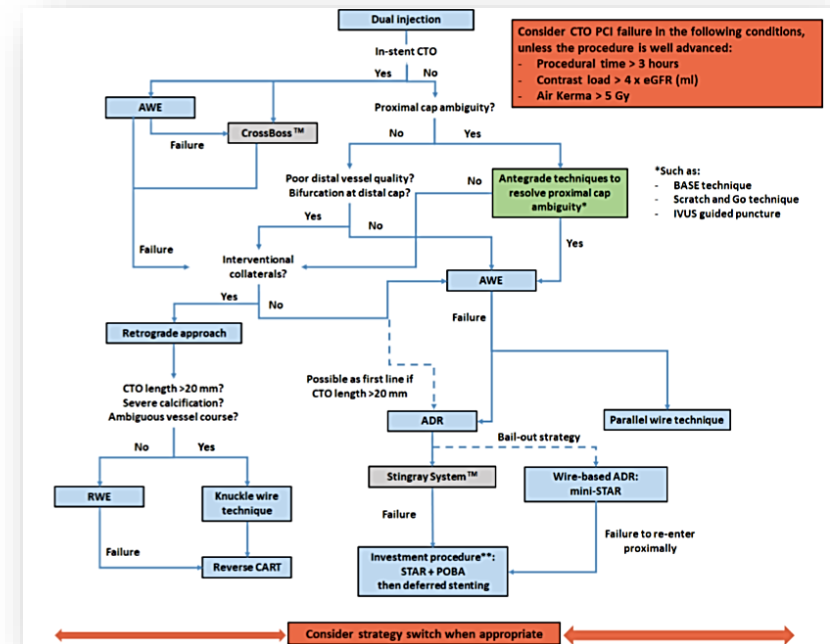
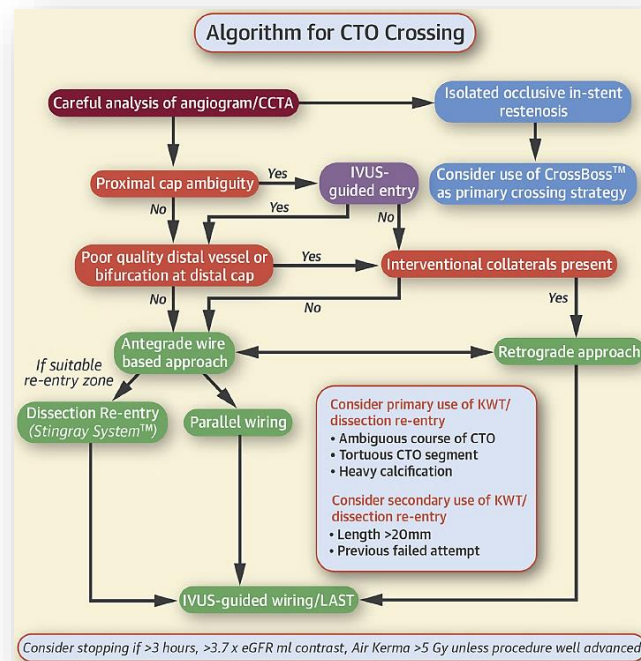






How to become a Hybrid operator ?

- ◆ Be able to alternate between these techniques during the same CTO PCI procedure - creatively study and apply
- ◆ Keep the algorithms in mind, but don't stick to it



Early Procedural and Health Status Outcomes After Chronic Total Occlusion Angioplasty

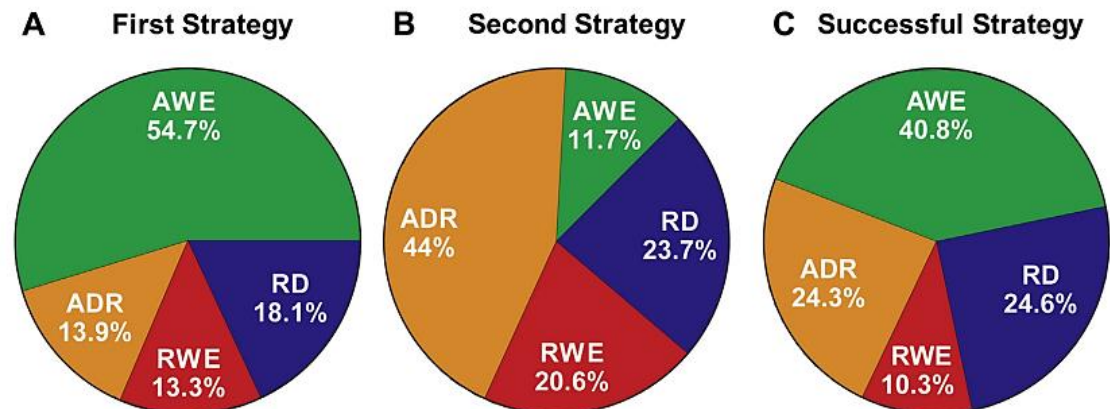


A Report From the OPEN-CTO Registry (Outcomes, Patient Health Status, and Efficiency in Chronic Total Occlusion Hybrid Procedures)

J Am Coll Cardiol Intv 2017;10:1523–34

- All-comers registry of 11 high volume experienced CTO operators
- In 44% of the cases, the initial crossing strategy was unsuccessful, and less than one-half of the second strategies employed were successful, requiring to move on to a third or fourth mode.

FIGURE 2 First, Second, and Successful Strategies Employed During Hybrid CTO PCI



Total arterial CABG
5Y



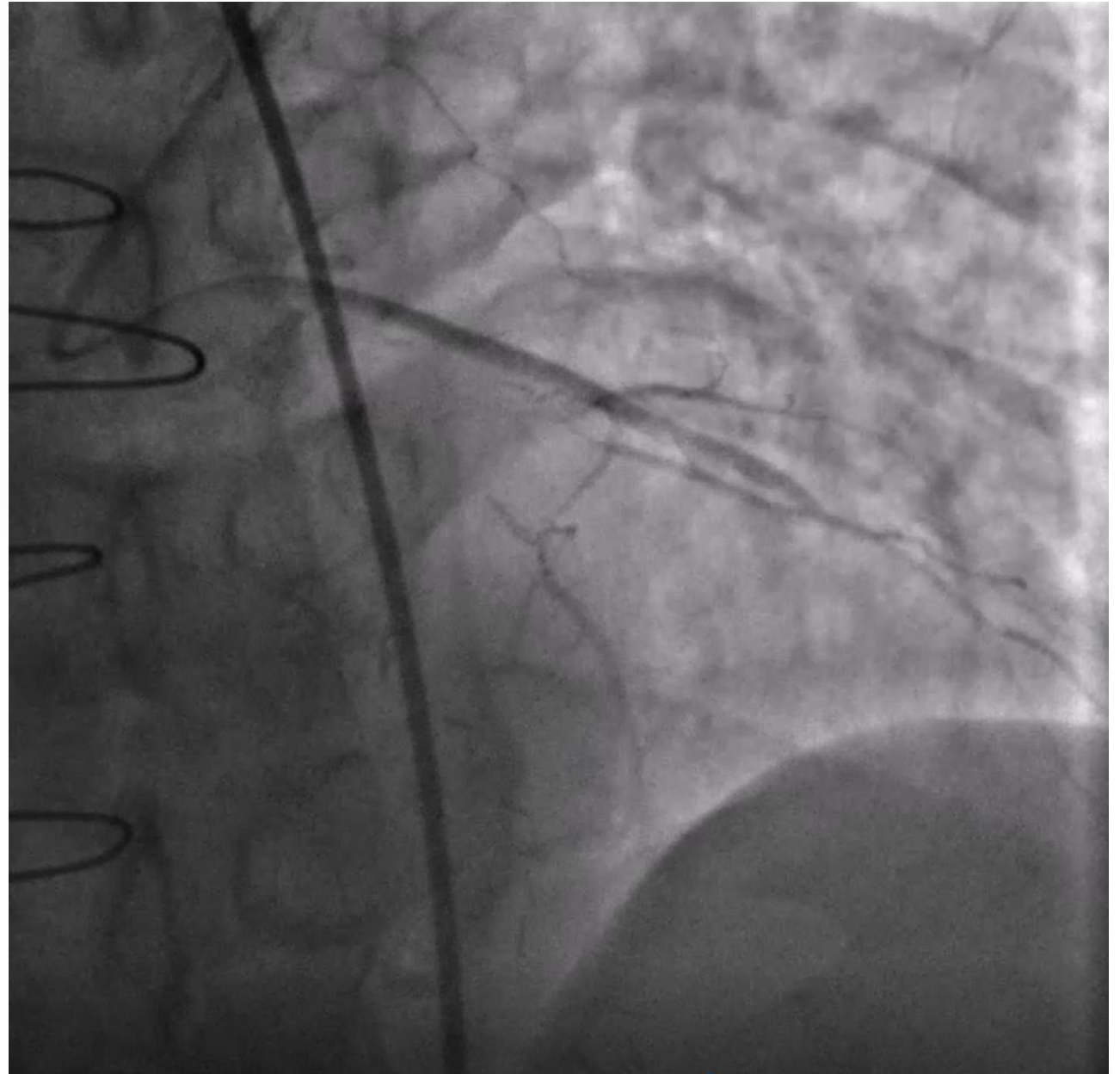
● Lima – D1

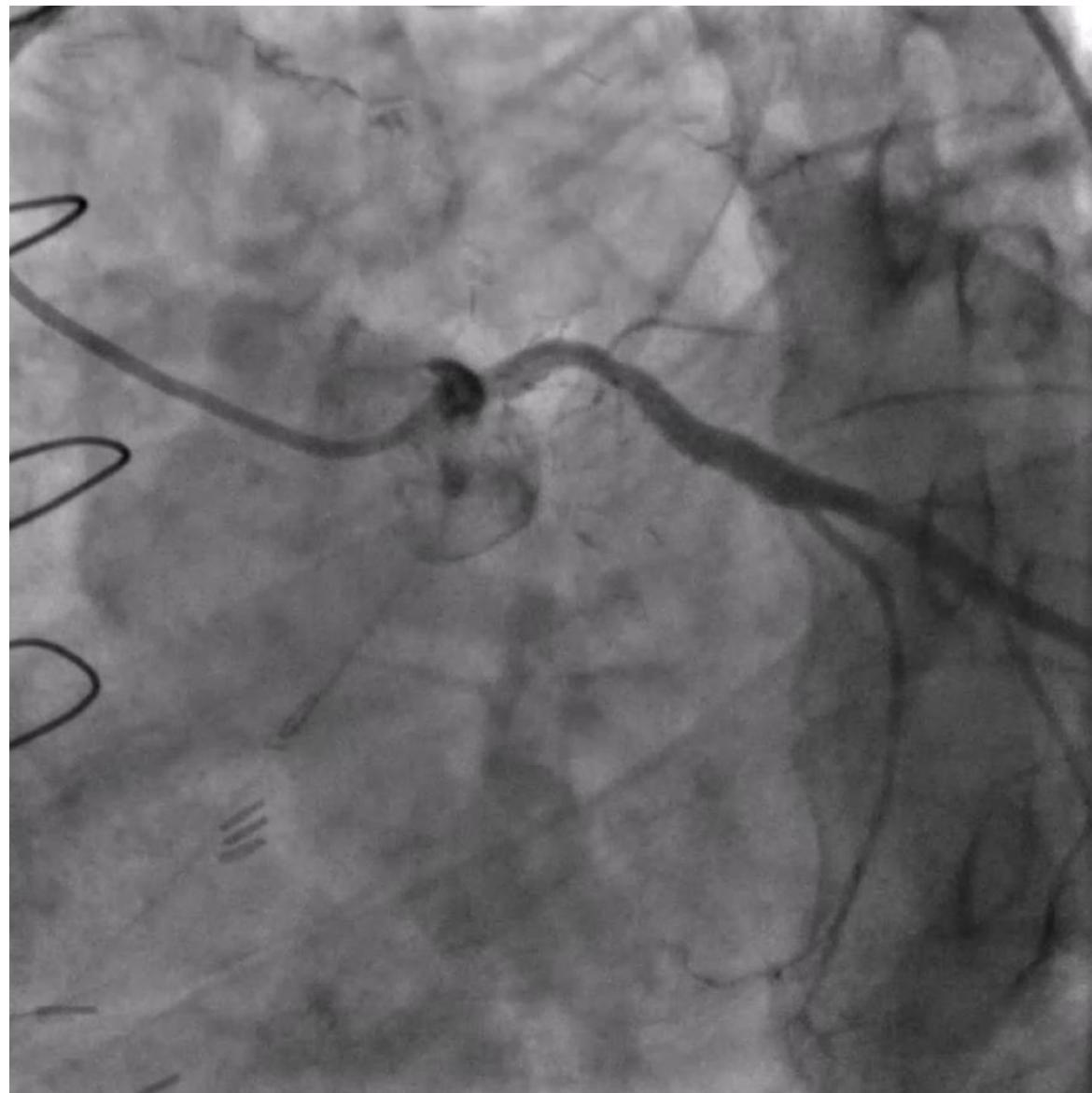


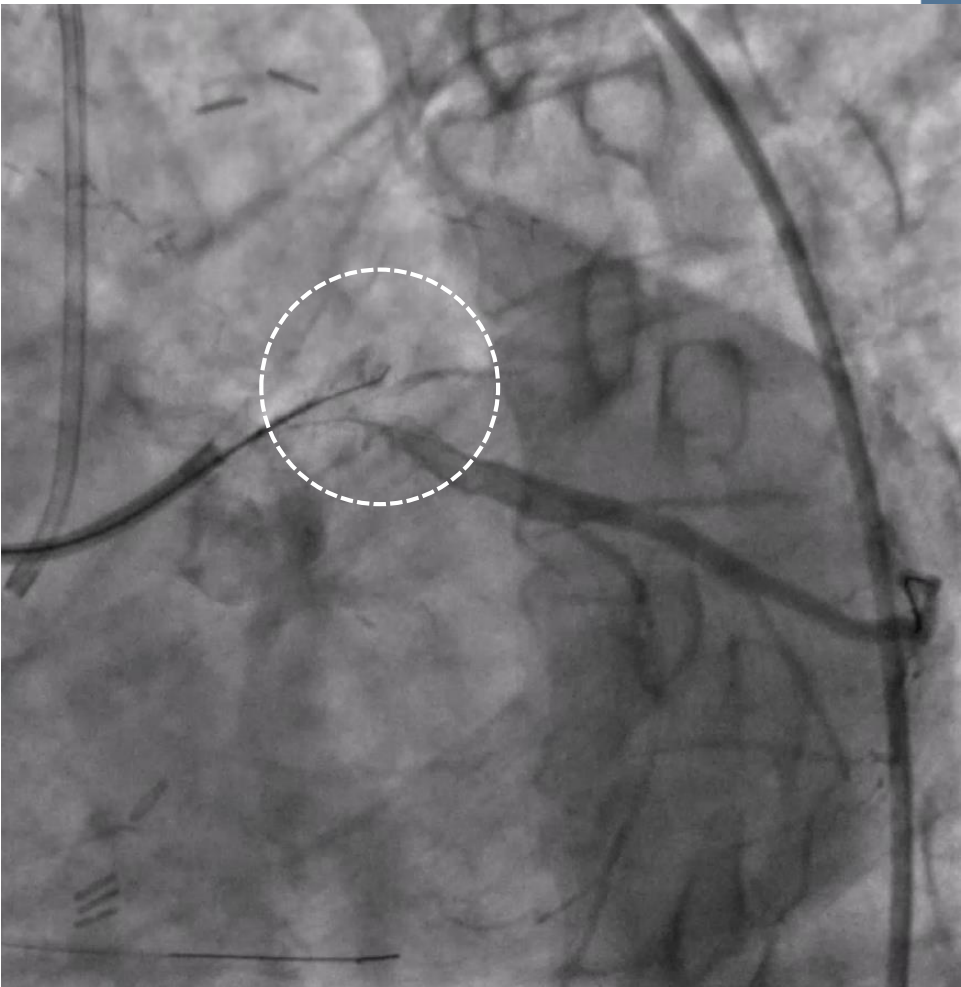
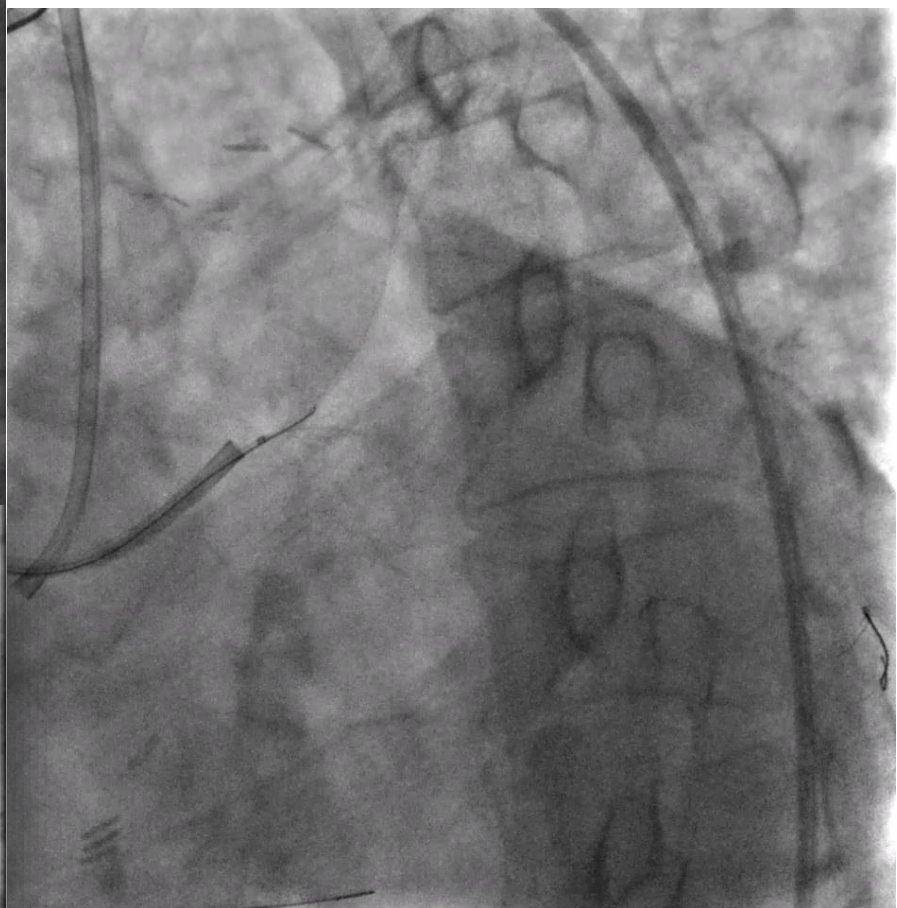
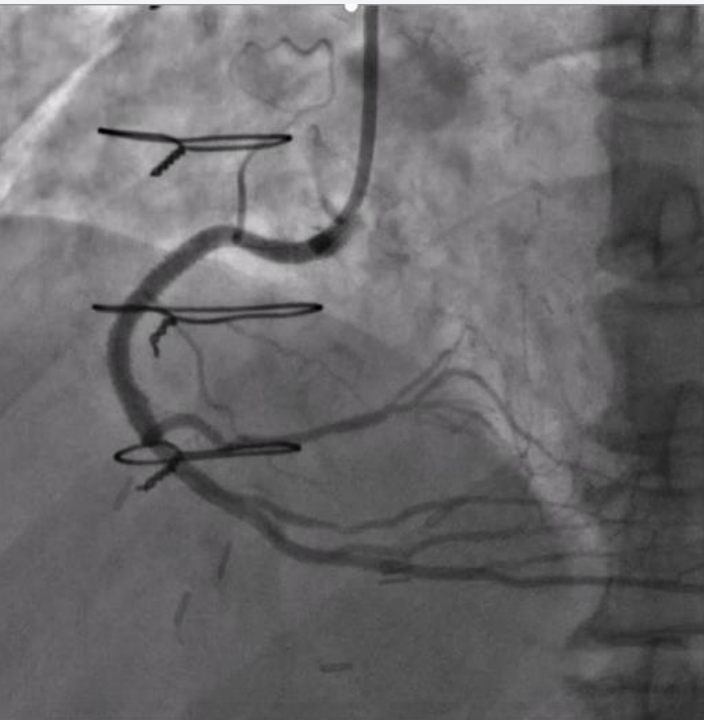
● Radial artery – LAD



● Right gastroepiploic
artery – RCA



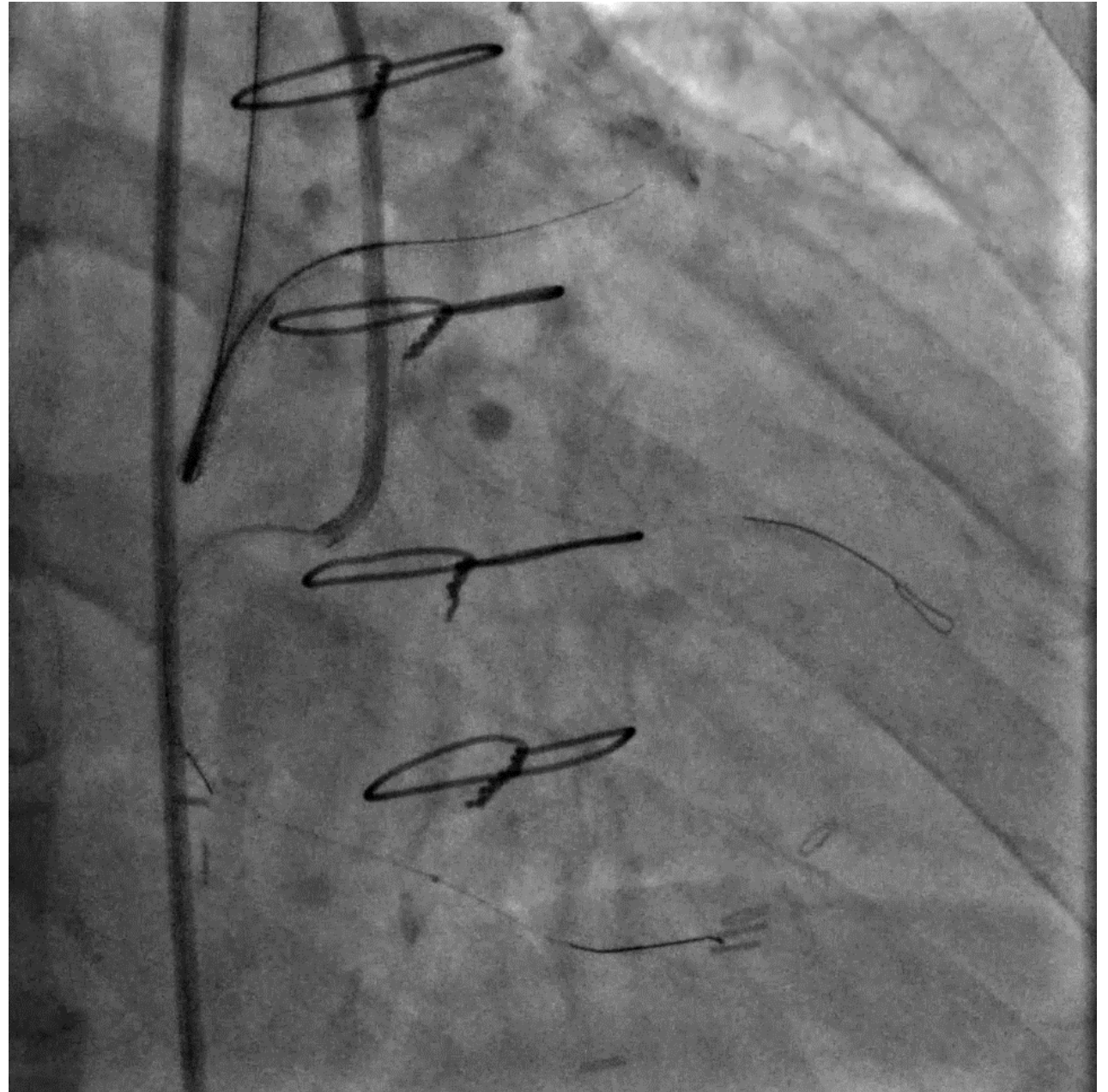




Crusade + CP 12

CP 8-20

Rapid switch



Rapid switch

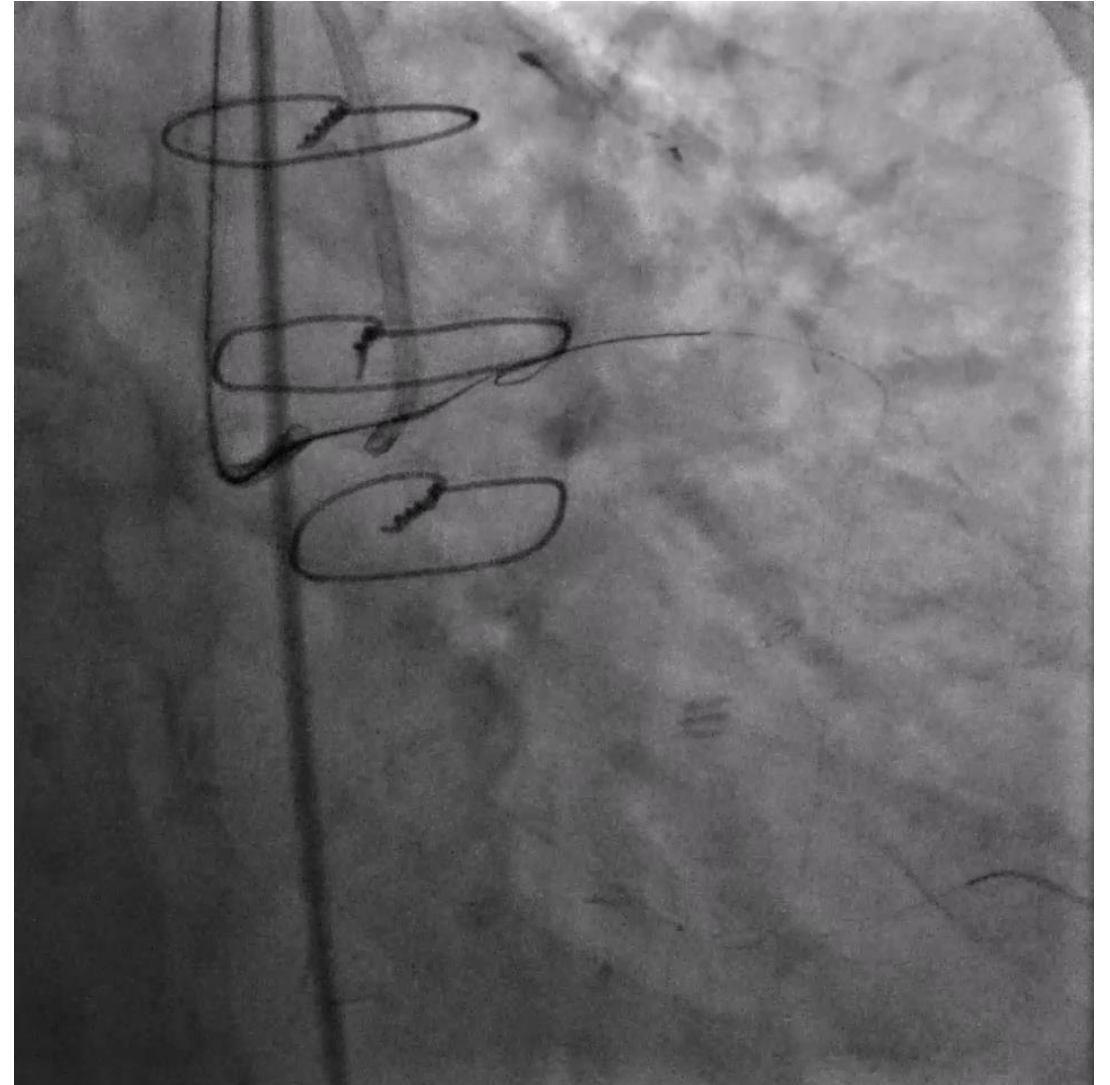
Retrograde MC couldn't cross

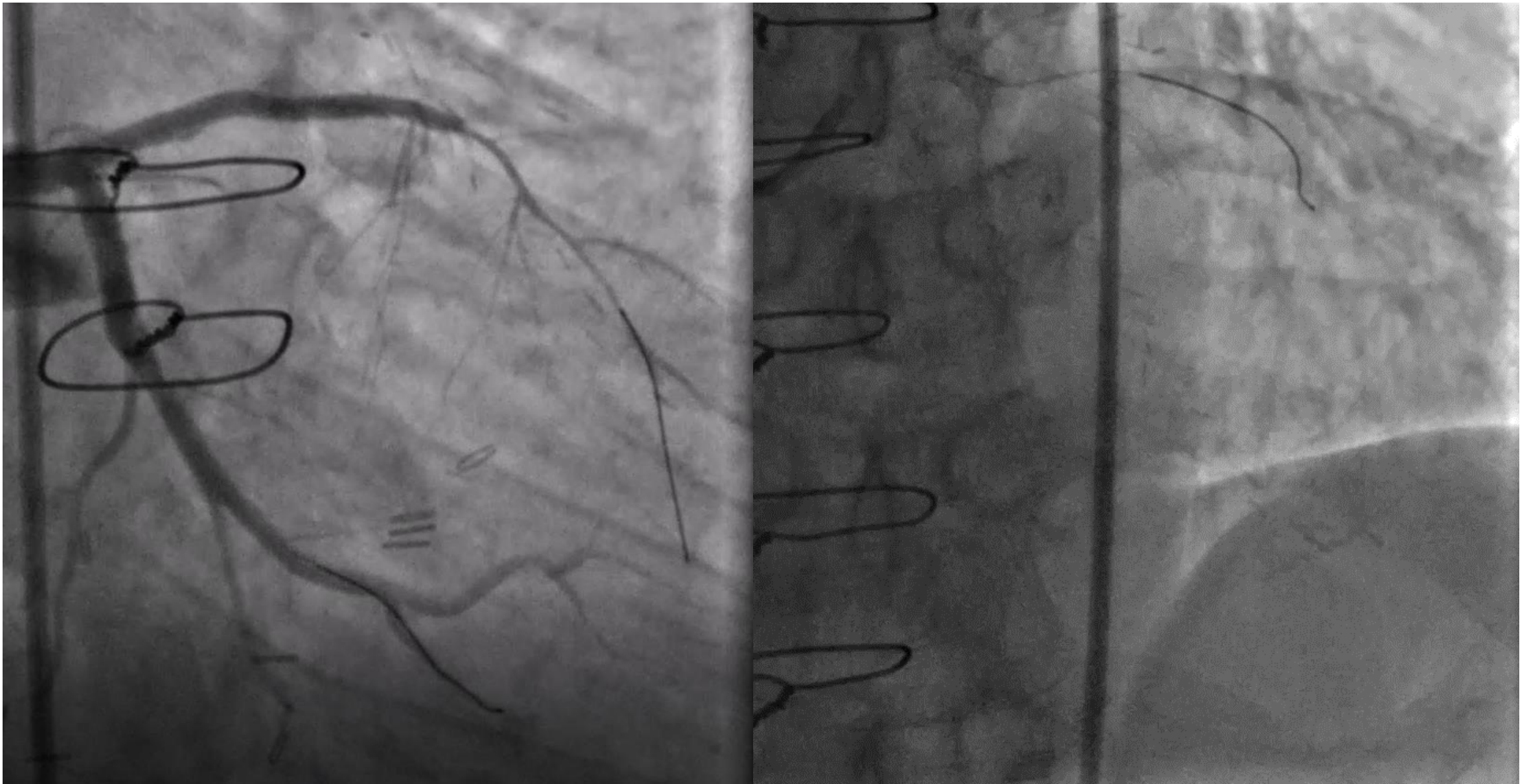


Kissing wire



Wire-based CART





Should grasp the tricks to deal with complications ?

CASE REVIEW

Silk Suture Embolization for Sealing Distal Coronary Artery Perforation:

Rev Cardiovasc Med. 2015

Yue Li,¹ Guotao Wang,² Li Sheng,¹ Jingyi Xue,¹ Dangh

¹Cardiovascular Department, the First Affiliated Hospital of Harbin Medical University, Harbin, Heilongjiang Province, China; ²Cardiovascular Department, Daqing People's Hospital, Daqing, Heilongjiang Province, China

Journal of Geriatric Cardiology (2018) 15: 1–4
©2018 JGC All rights reserved; www.jgc301.com



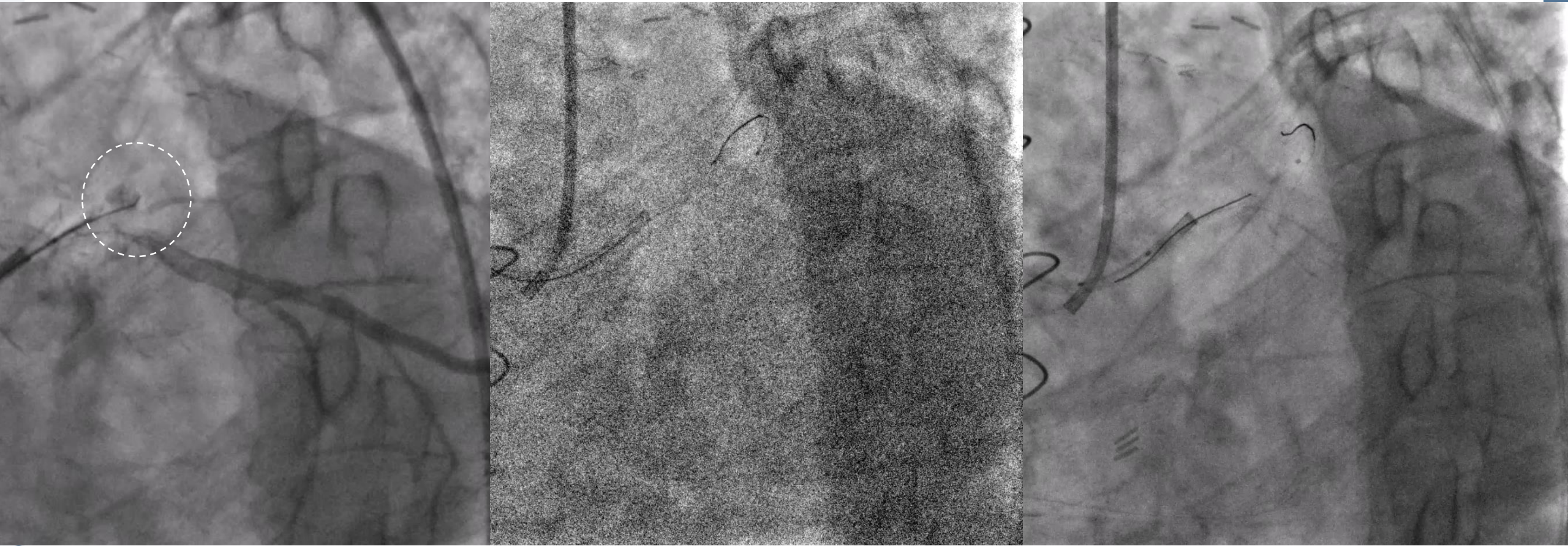
Letter to the Editor

• Open Access •

Successful occluding by absorbable sutures for epicardial collateral branch perforation

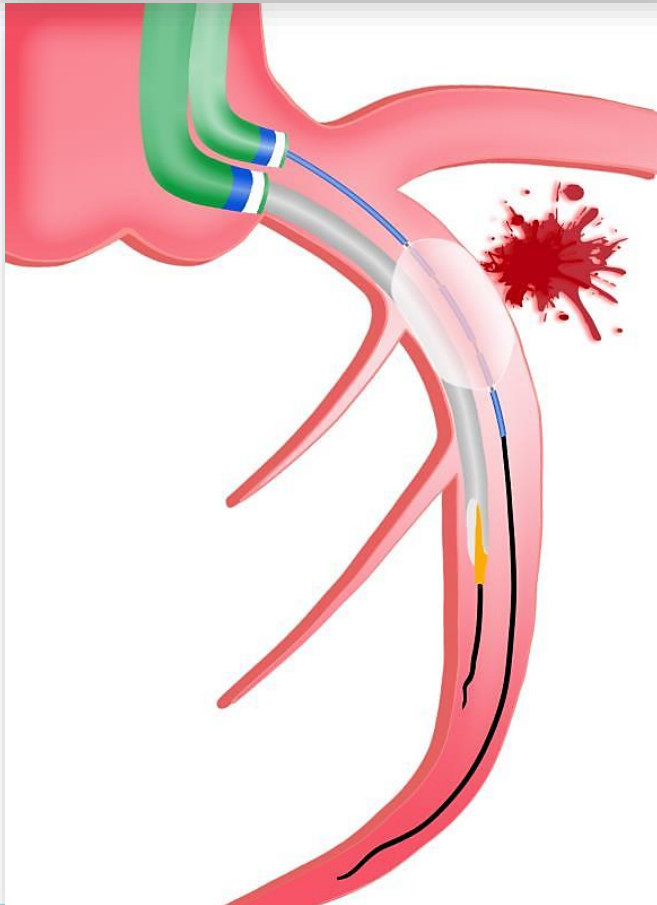
Li SHENG, Yong-Tai GONG, Dang-Hui SUN, Yue LI*



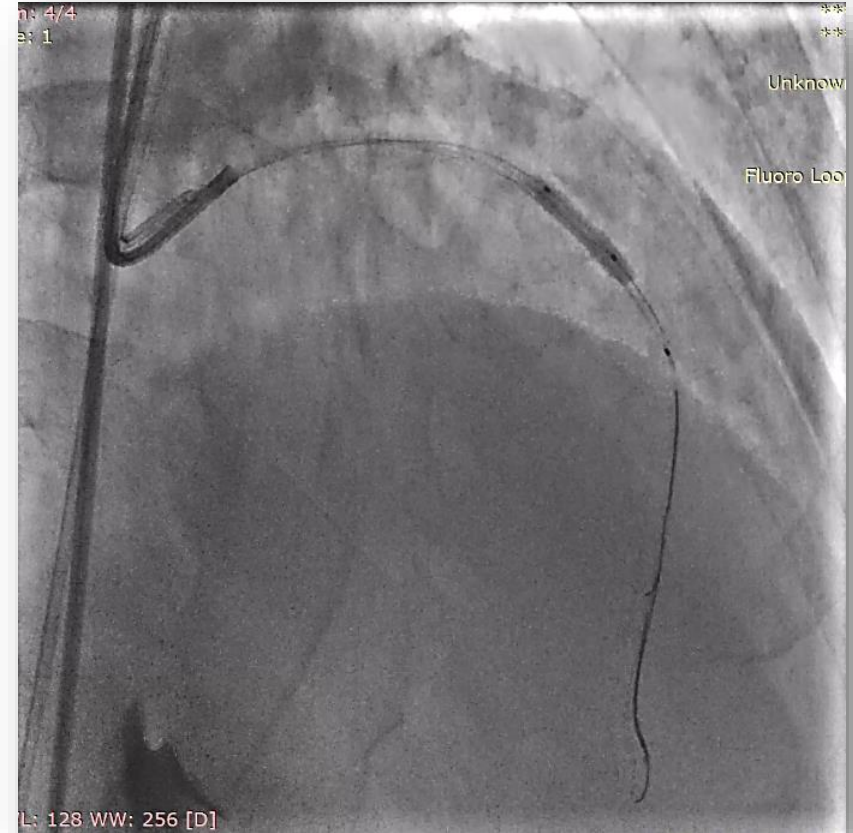


The balloon occlusion and thrombus aspiration catheter mediated-distal coronary perfusion technique (BI-RESCUE) for treatment of coronary artery perforation

Yong-Tai GONG*, Song ZHANG*, Ding-Yu WANG, Dang-Hui SUN, Li SHENG, Yue LI✉

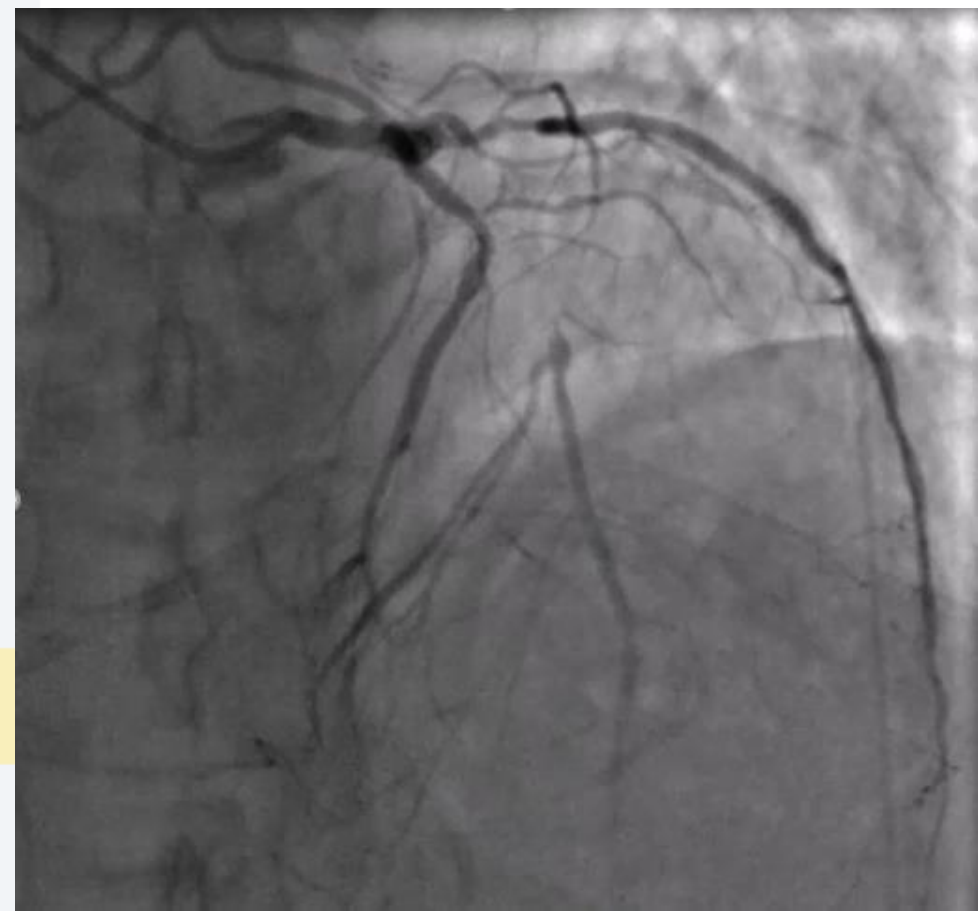


J Geriatr Cardiol. 2021;18(2):E1-E5

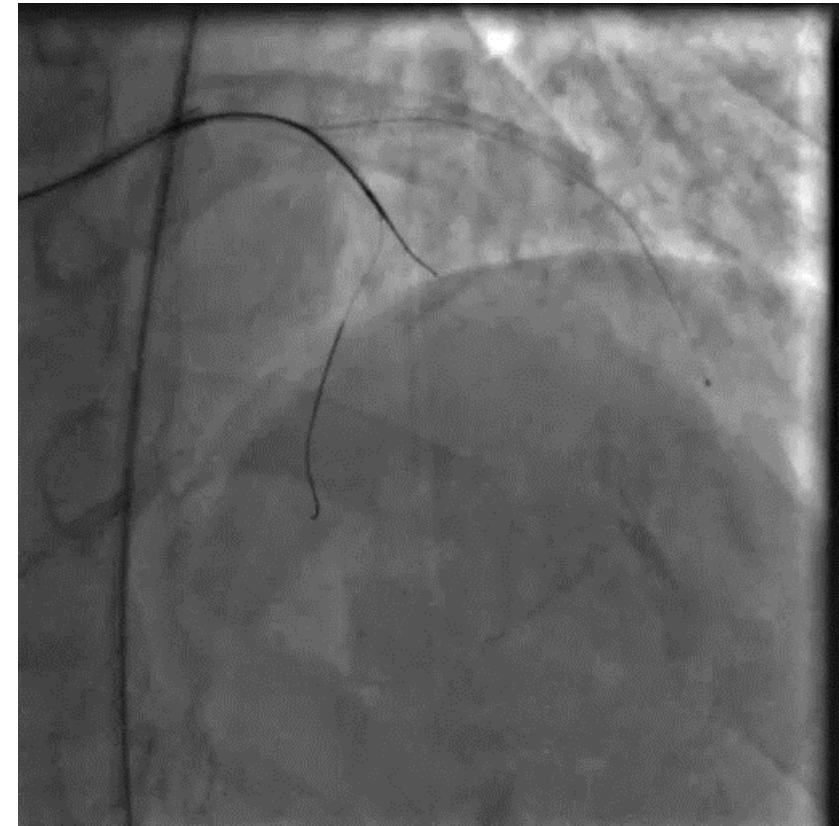
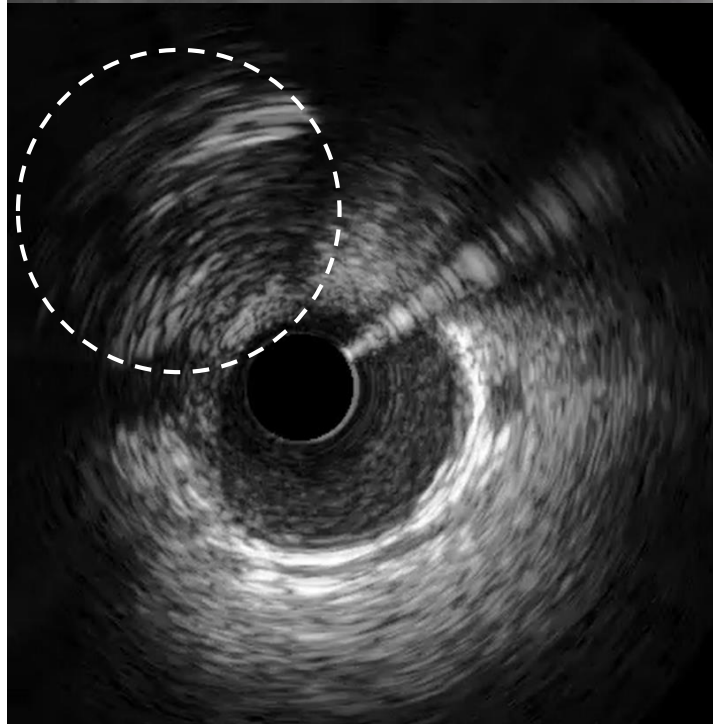


The **B**alloon occlusion and th**R**ombus aspiration cath**E**ter mediated-di**S**tal Coronary perf**U**sion t**E**chnique
(**BI-RESCUE**)

Complication - prevention is better than cure !



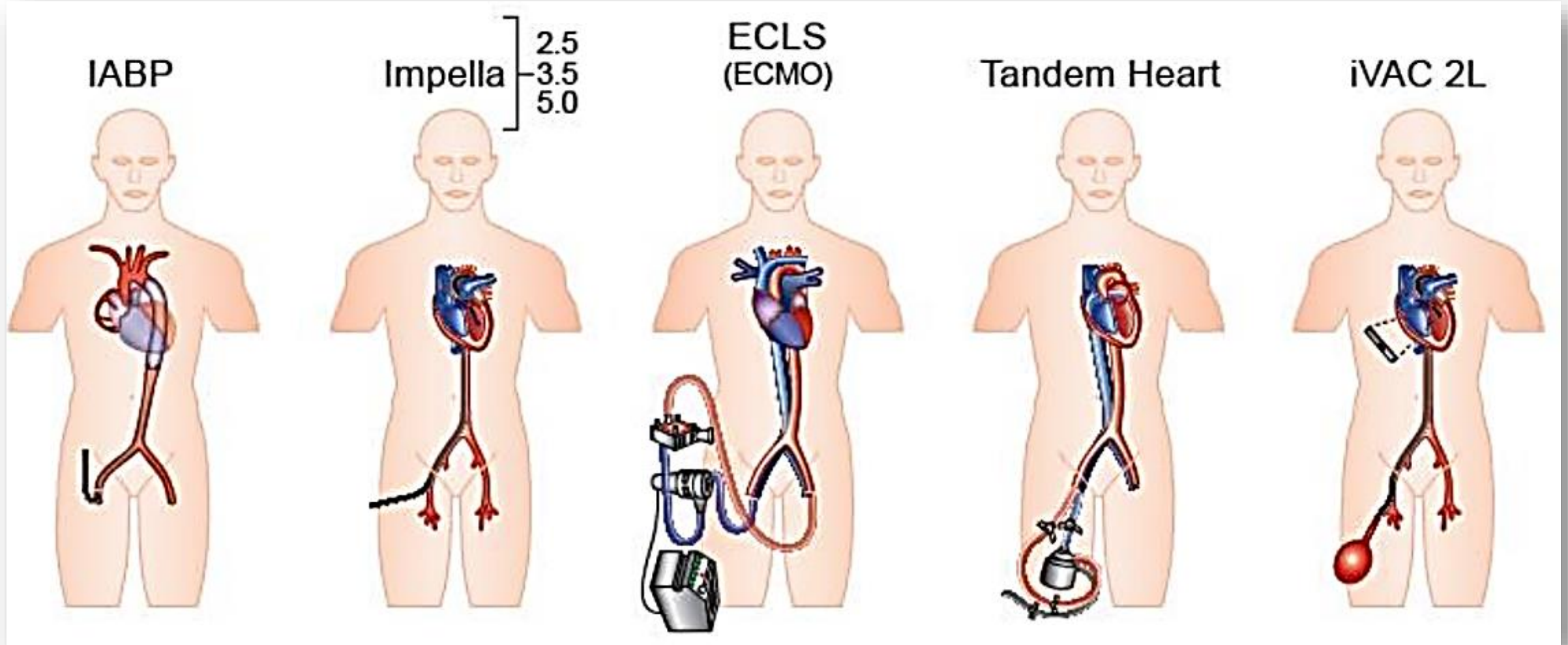
HF + CKD



IABP
+
IVUS
+
Superselective injection



Currently Available Percutaneous Devices

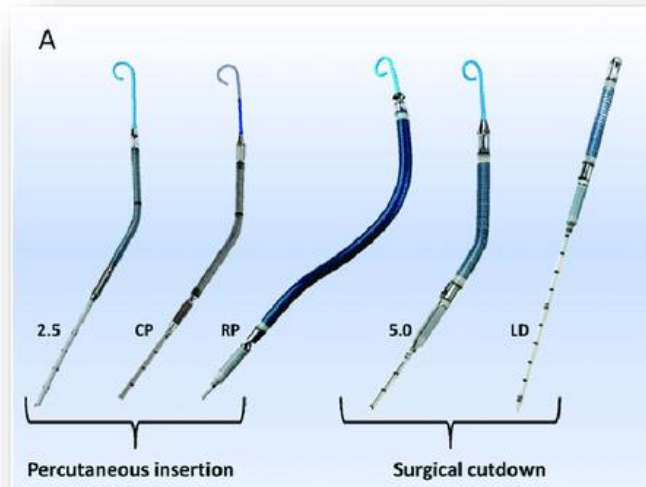


IMPELLA

Impella-assisted chronic total occlusion percutaneous coronary interventions: A multicenter retrospective analysis



Catheter Cardiovasc Interv. 2018;92(7):1261-1267



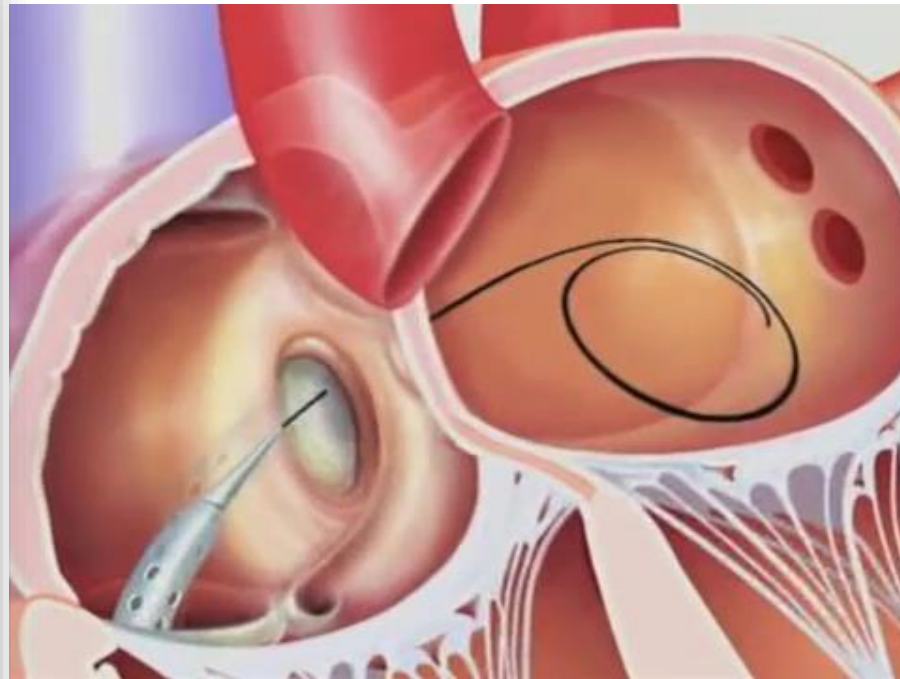
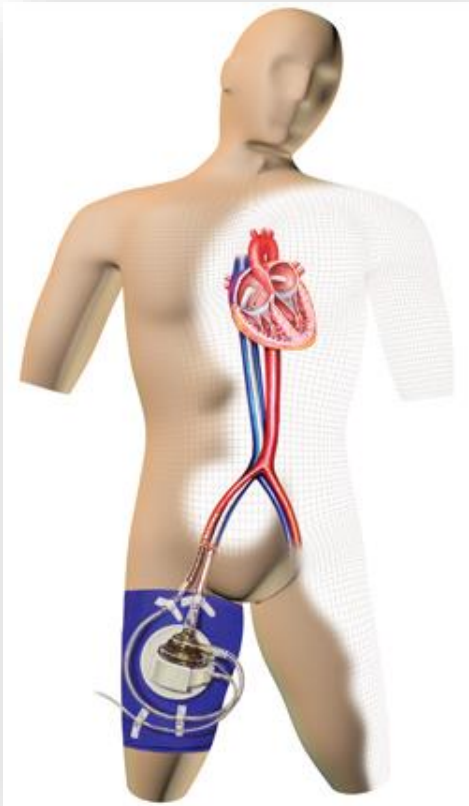
Impella-assisted CTO PCI can be performed **with high technical success rates**. However, assiduous attention to appropriate case selection is critical, given the **periprocedural complication** rates reported in this patient population.

TandemHeart

High-Risk Chronic Total Occlusion Percutaneous Coronary Interventions Assisted With TandemHeart

Saroj Neupane, MD; Mir Basir, DO; Mohammed Alqarqaz, MD; William O'Neill, MD; Khaldoon Alaswad, MD

J INVASIVE CARDIOL 2020;32(3):94-97



TandemHeart can be used for hemodynamic support during CTO-PCI to achieve a very **high technical success rate**.

Home message

- ◆ **CHIP-CTO** is characterized with patient, lesion and hemodynamic level risk factor compare with that of “normal” CTO PCI.
- ◆ **Team work** and proper training is of great importance in guarantee success of CHIP-CTO.
- ◆ In order to recanalize CHIP-CTO lesions with high quality, operators should strive to become **hybrid CTO operator**.



Thanks !

