

# CTO Crossing Strategy Selection

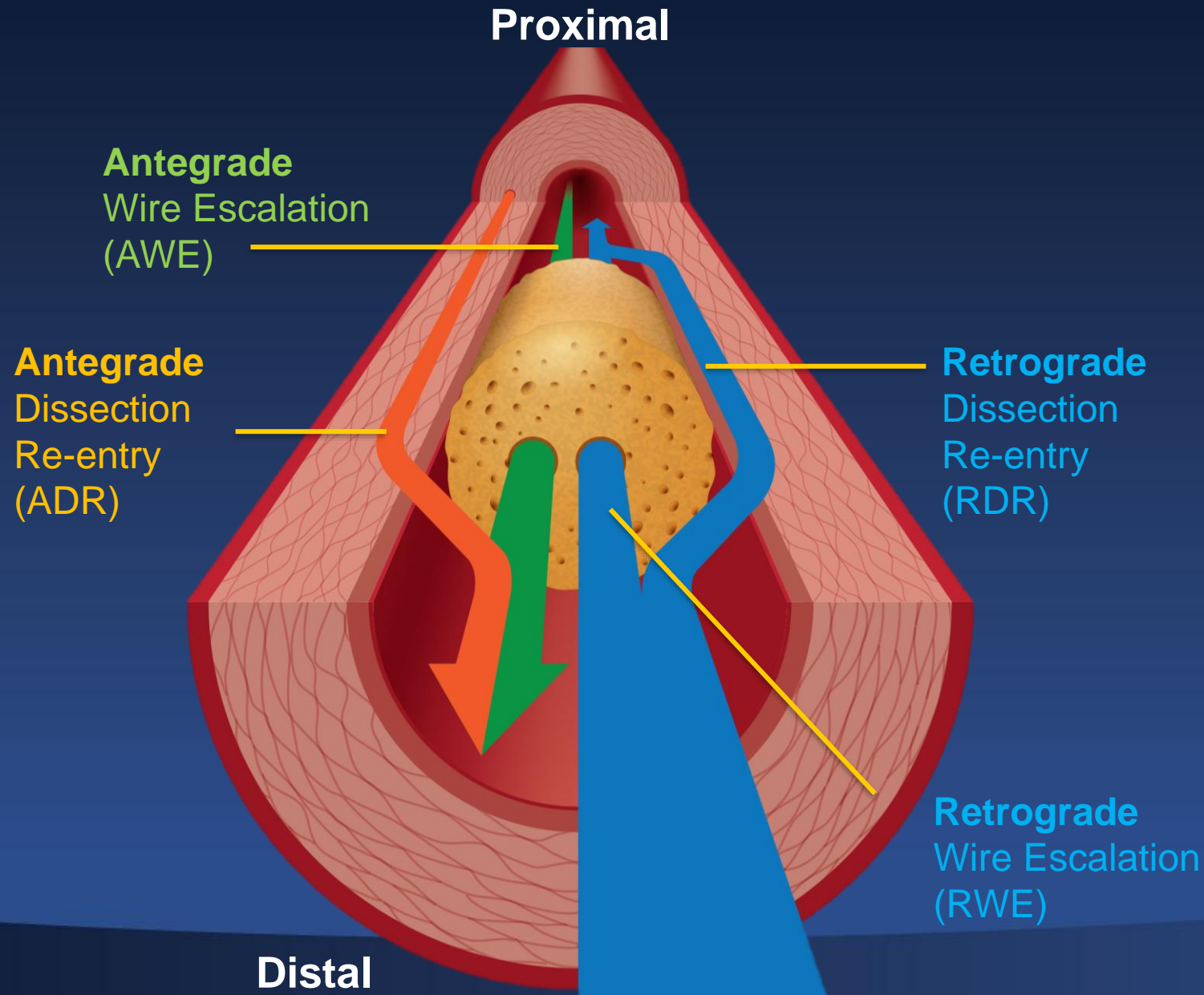
*Ajay J. Kirtane, MD, SM*

*Columbia Interventional Cardiovascular Care  
Columbia University Irving Medical Center /  
New York-Presbyterian Hospital*

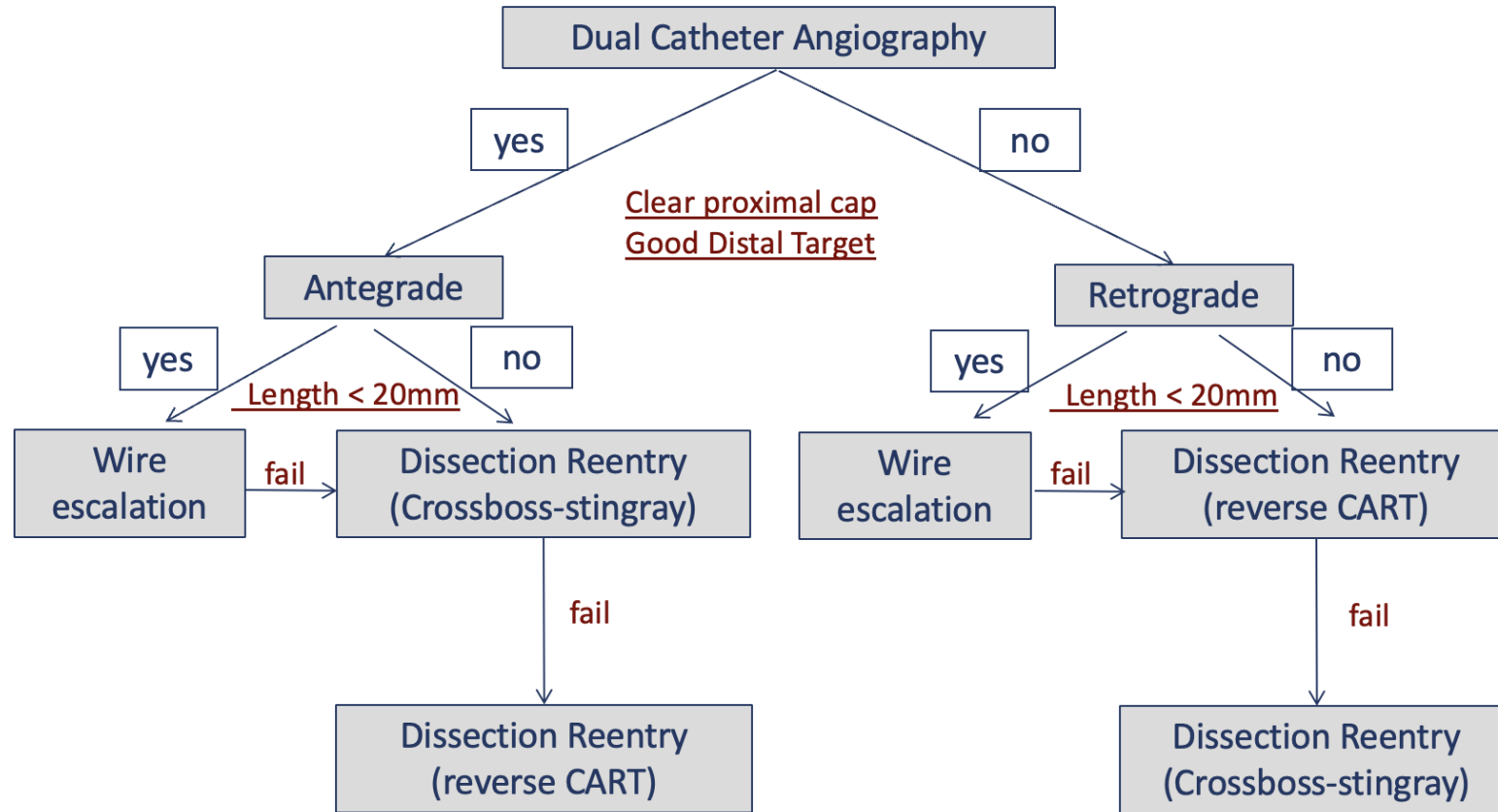
# Financial Conflict of Interest Disclosure

Dr. Kirtane reports Institutional funding to Columbia University and/or Cardiovascular Research Foundation from Abbott Vascular, Amgen, Biotronik, Boston Scientific, Bolt Medical, CathWorks, Concept Medical, Cordis, Magenta Medical, Medtronic, Neurotronic, Philips, ReCor Medical, and Supira. In addition to research grants, institutional funding includes fees paid to Columbia University and/or Cardiovascular Research Foundation for consulting and/or speaking engagements in which Dr. Kirtane controlled the content. Personal: Equity options in Bolt Medical, Airiver; consulting from Sonivie; Travel Expenses/Meals from Amgen, Medtronic, Biotronik, Boston Scientific, Abbott Vascular, CathWorks, Concept Medical, Novartis, Philips, Abiomed, ReCor Medical, Chiesi, Supira, and Shockwave.

# 4 options for crossing CTOs

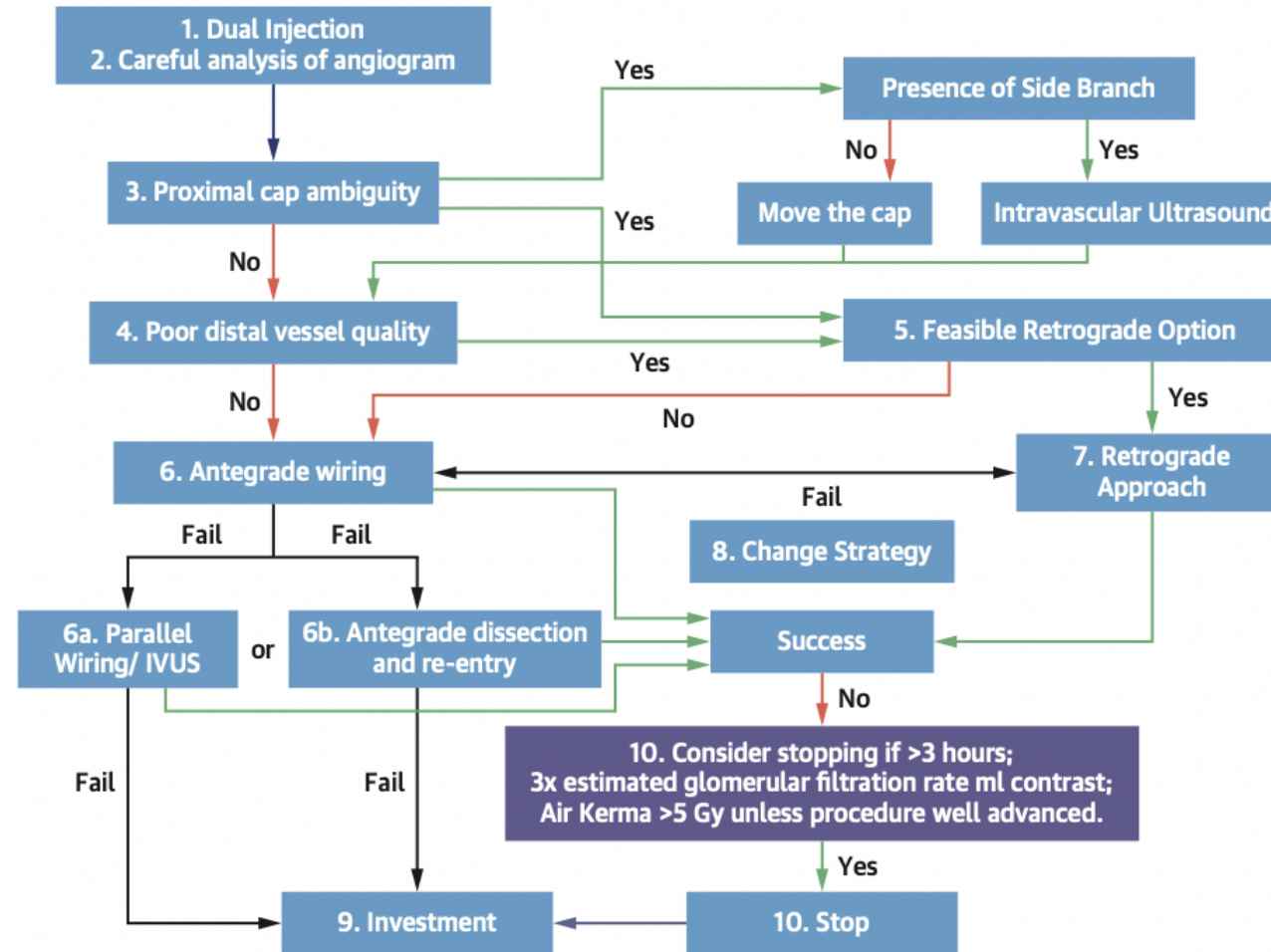


# Hybrid Algorithm



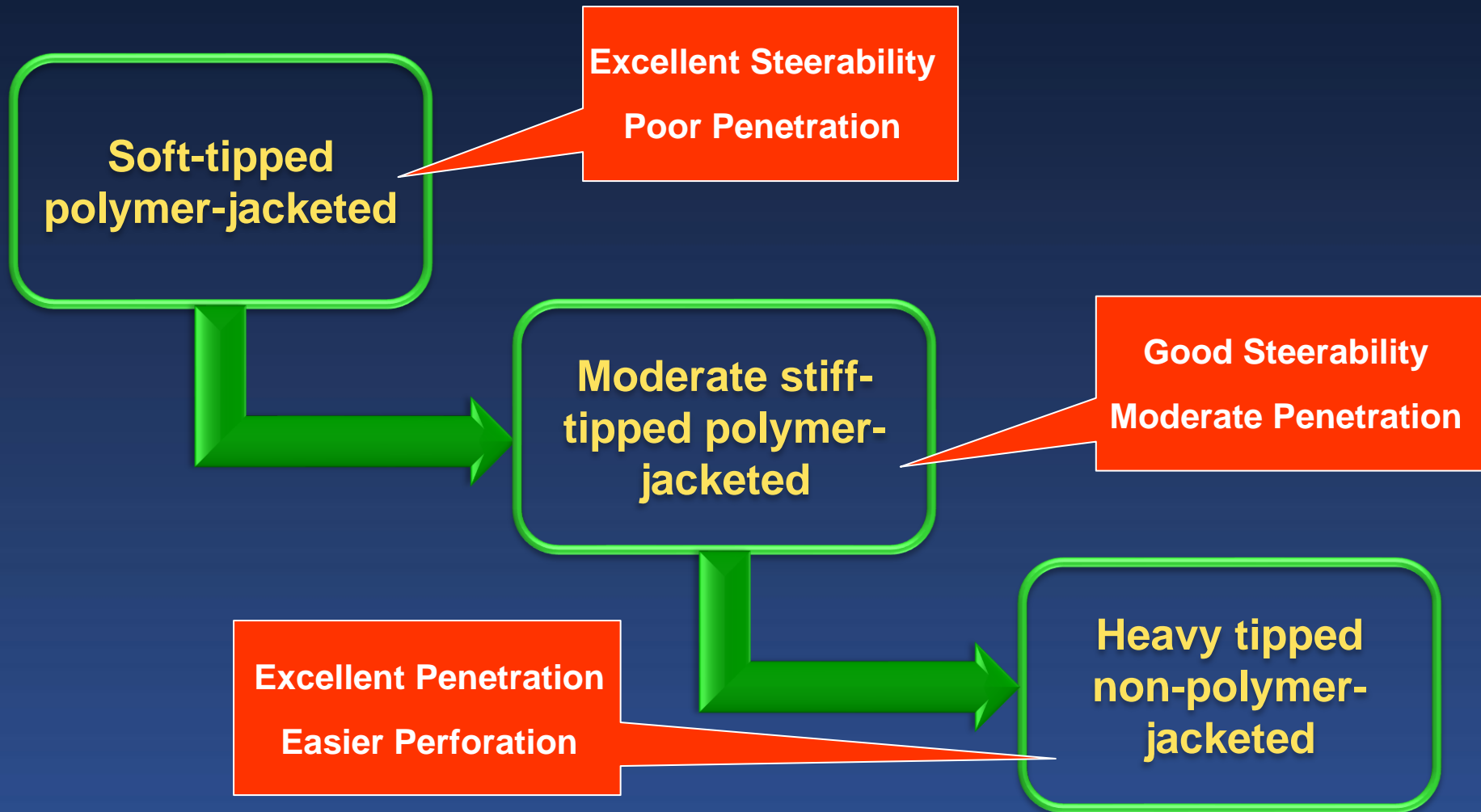
Courtesy Craig A. Thompson, M.D., MMsc.

# Global Algorithm



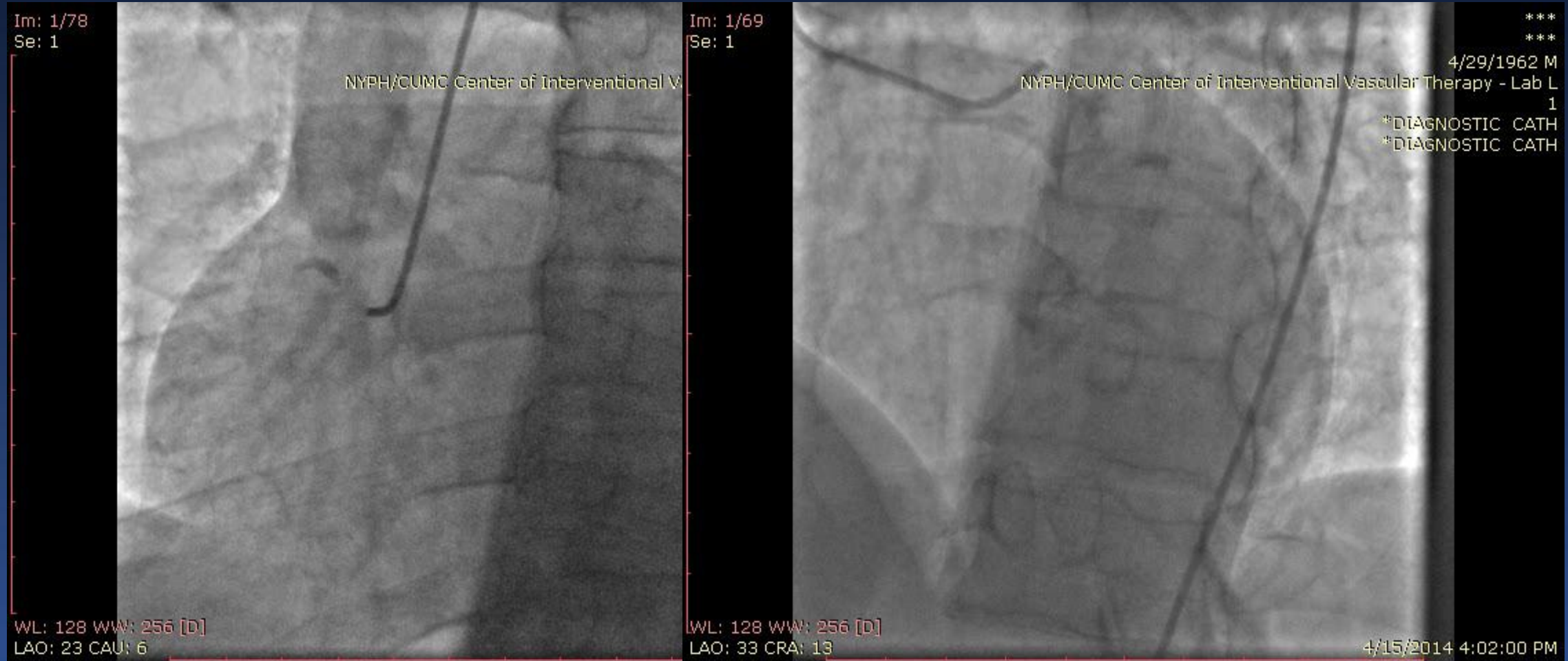
Wu, E.B. et al. J Am Coll Cardiol. 2021;78(8):840-853.

# Antegrade Wire Escalation

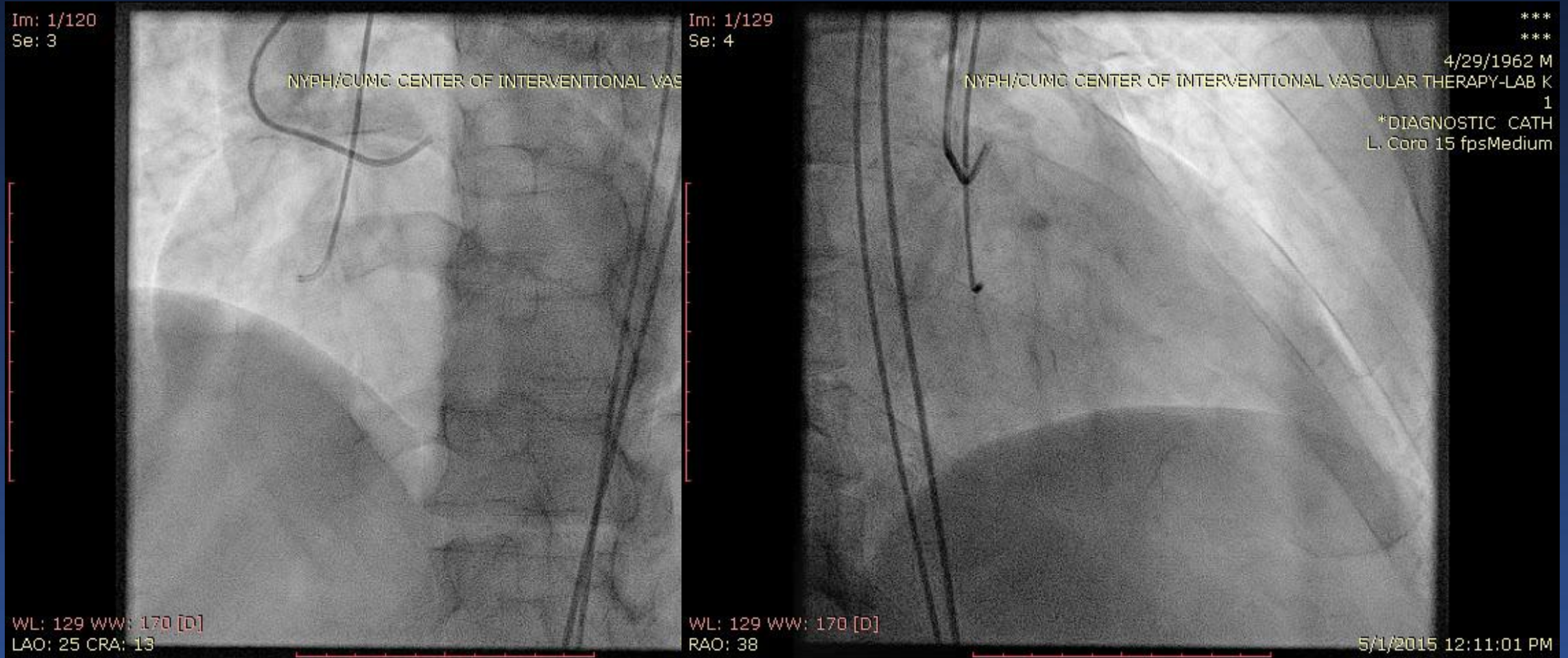




# Where is the Collateral?

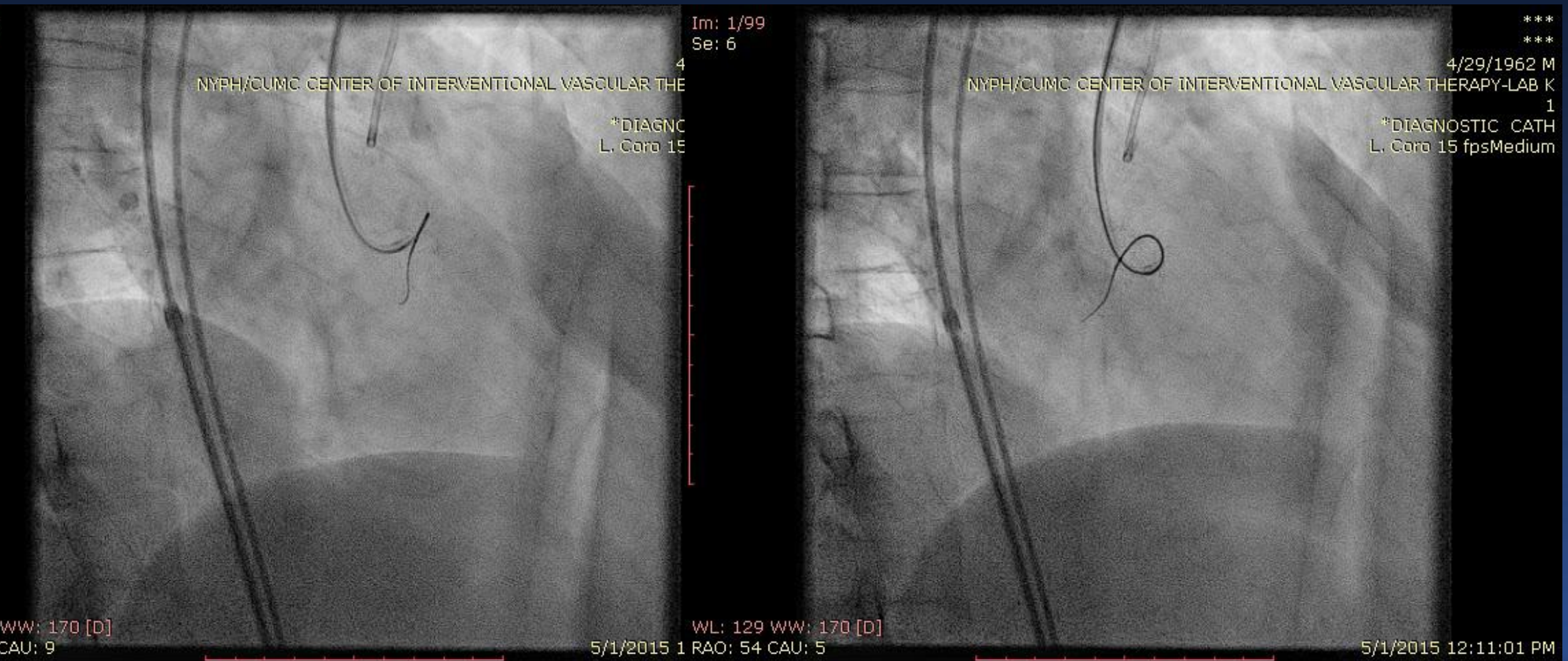


# Return with Dual Injections

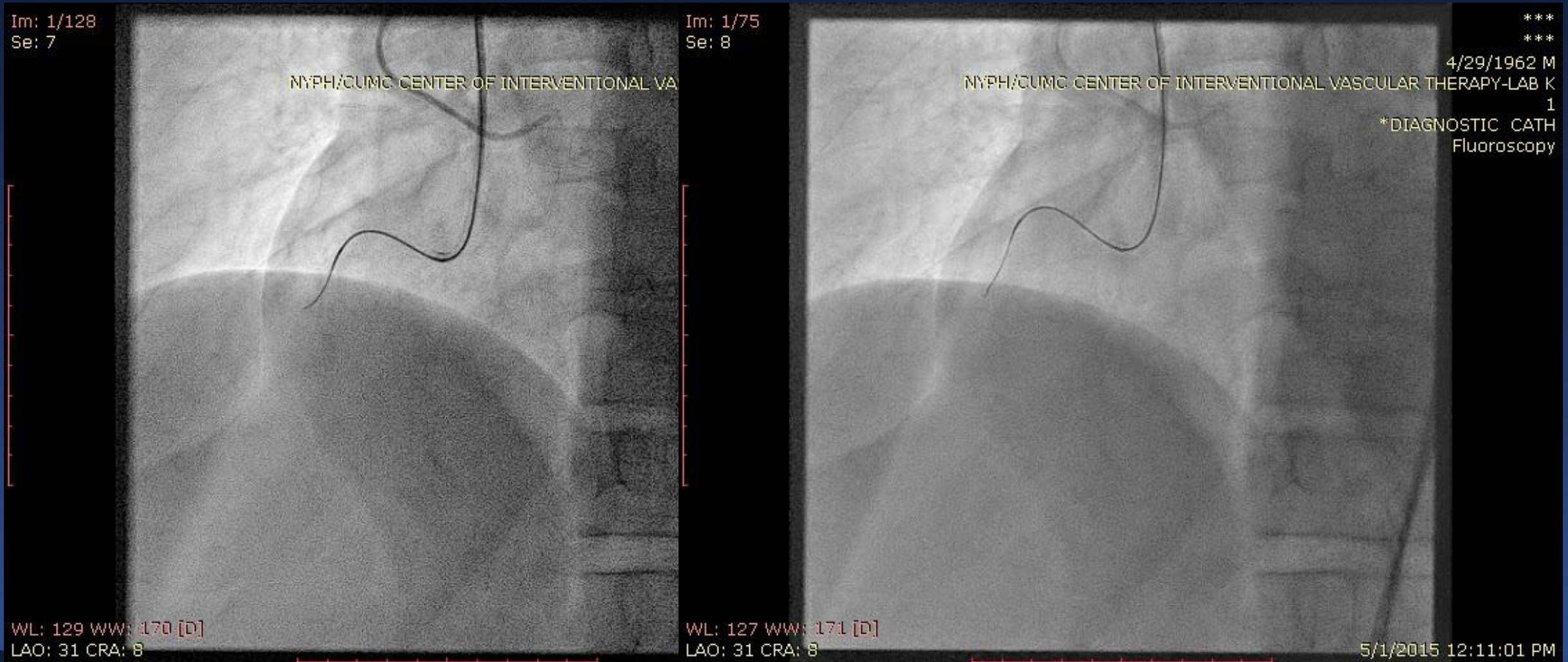




# Loss of Antegrade Perfusion

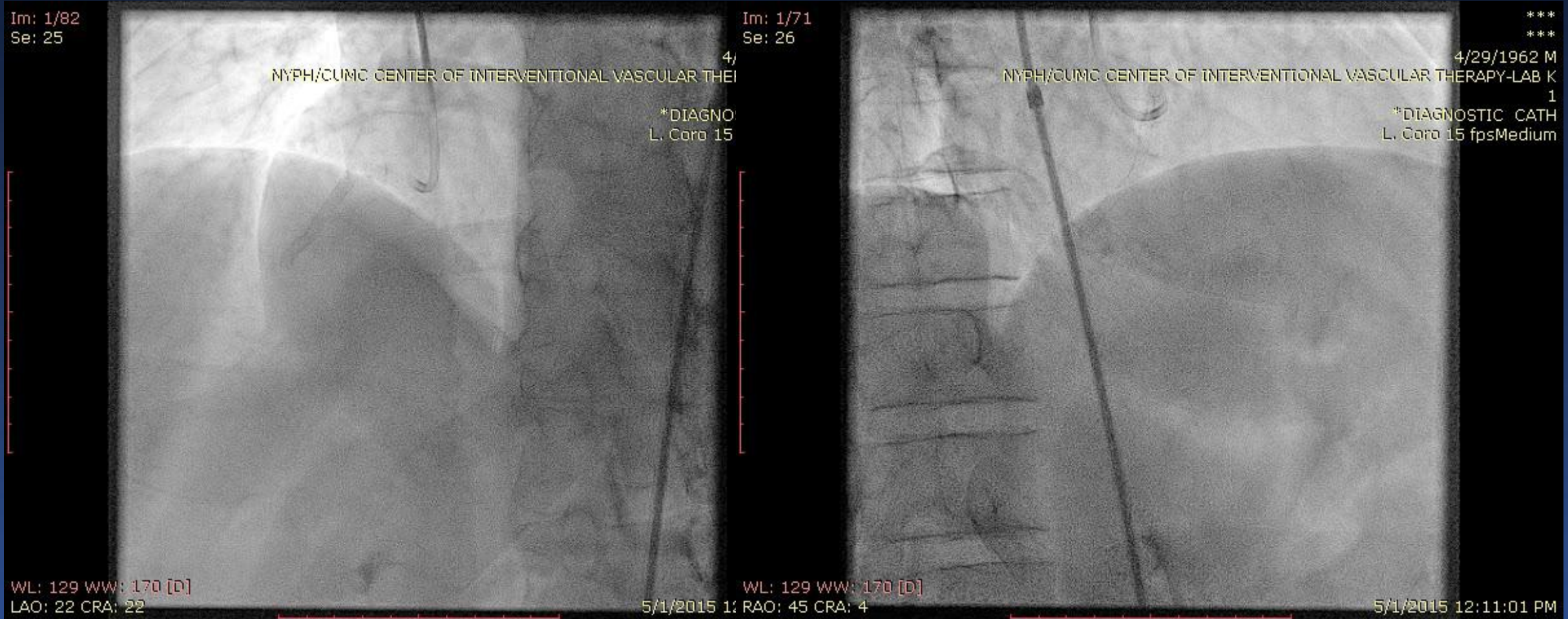


# Importance of Dual Injection





# Final Angiogram



# Microcatheter Strategy

**\* 7F: C Pro XS + 5F IVUS**



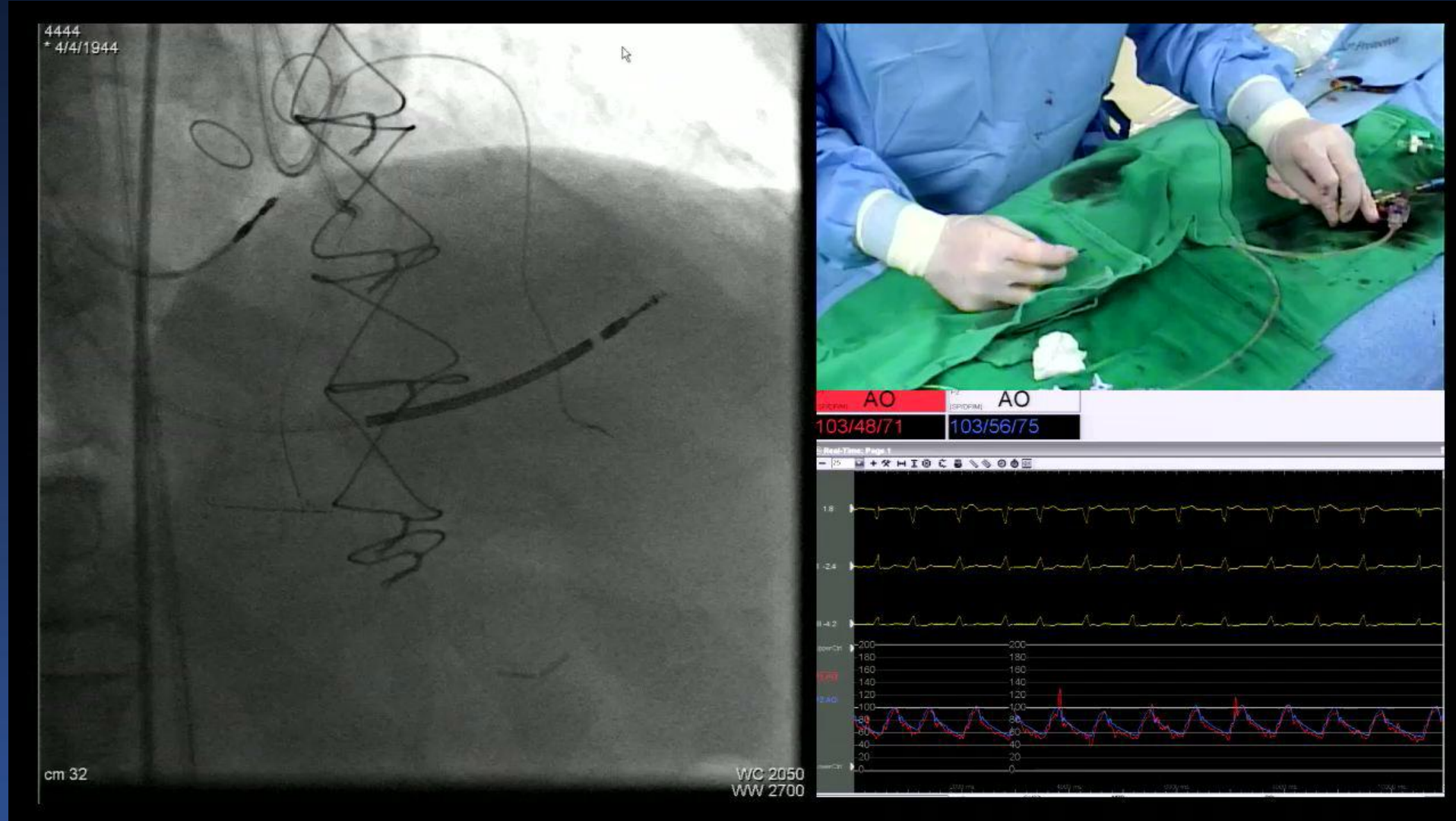
**Antegrade: Corsair Pro, Turnpike Spiral, Finecross, Corsair Pro XS\***



**Retrograde: C Pro XS – septal; Caravel – epicardial**

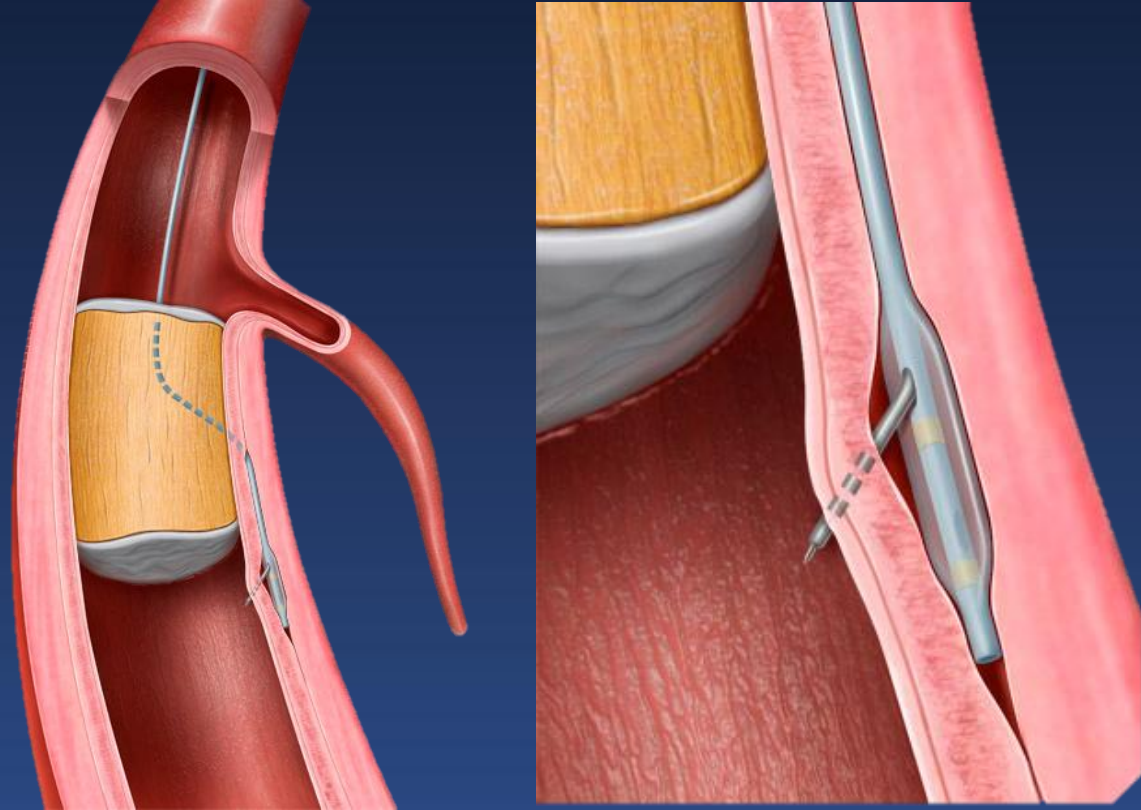


# Microcatheter Advancement



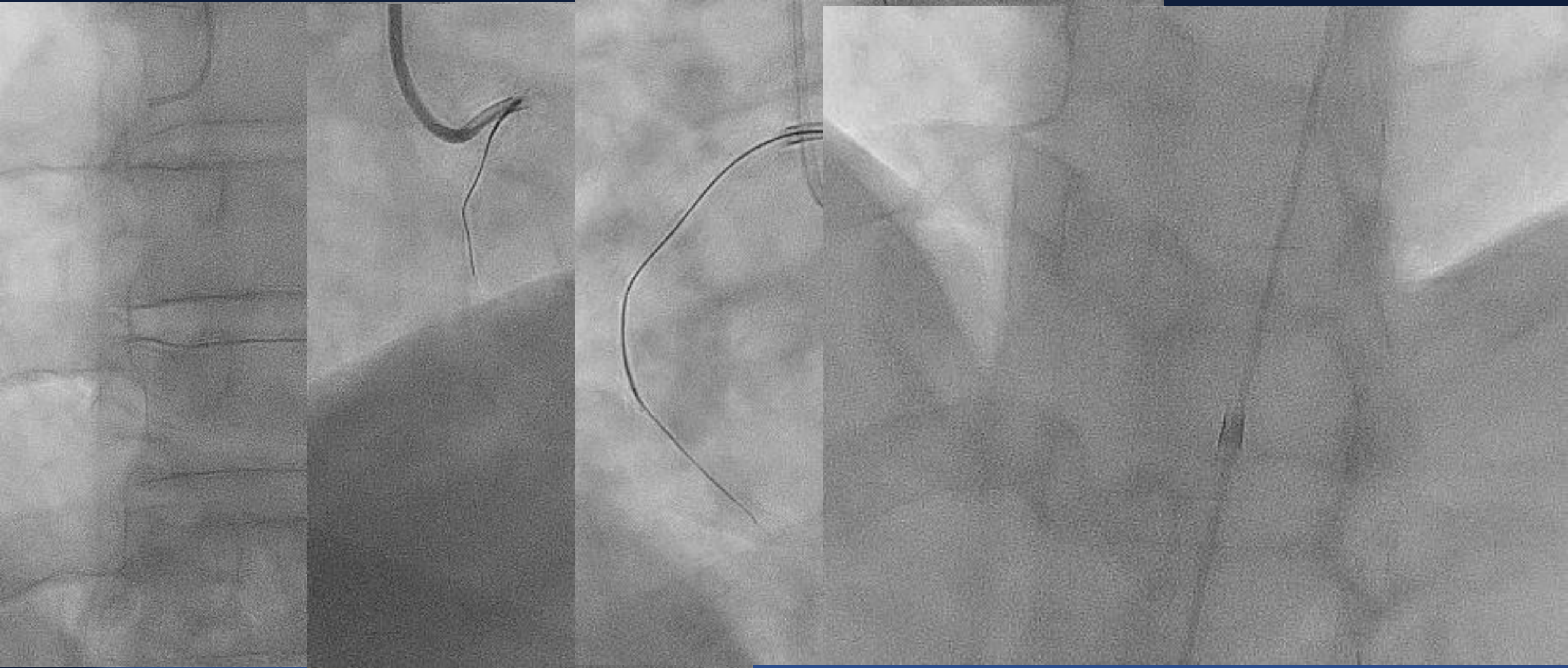
# Antegrade Dissection Re-Entry

CTO crossing through the subintimal space, advancing across the occlusion, re-entering into the distal true lumen



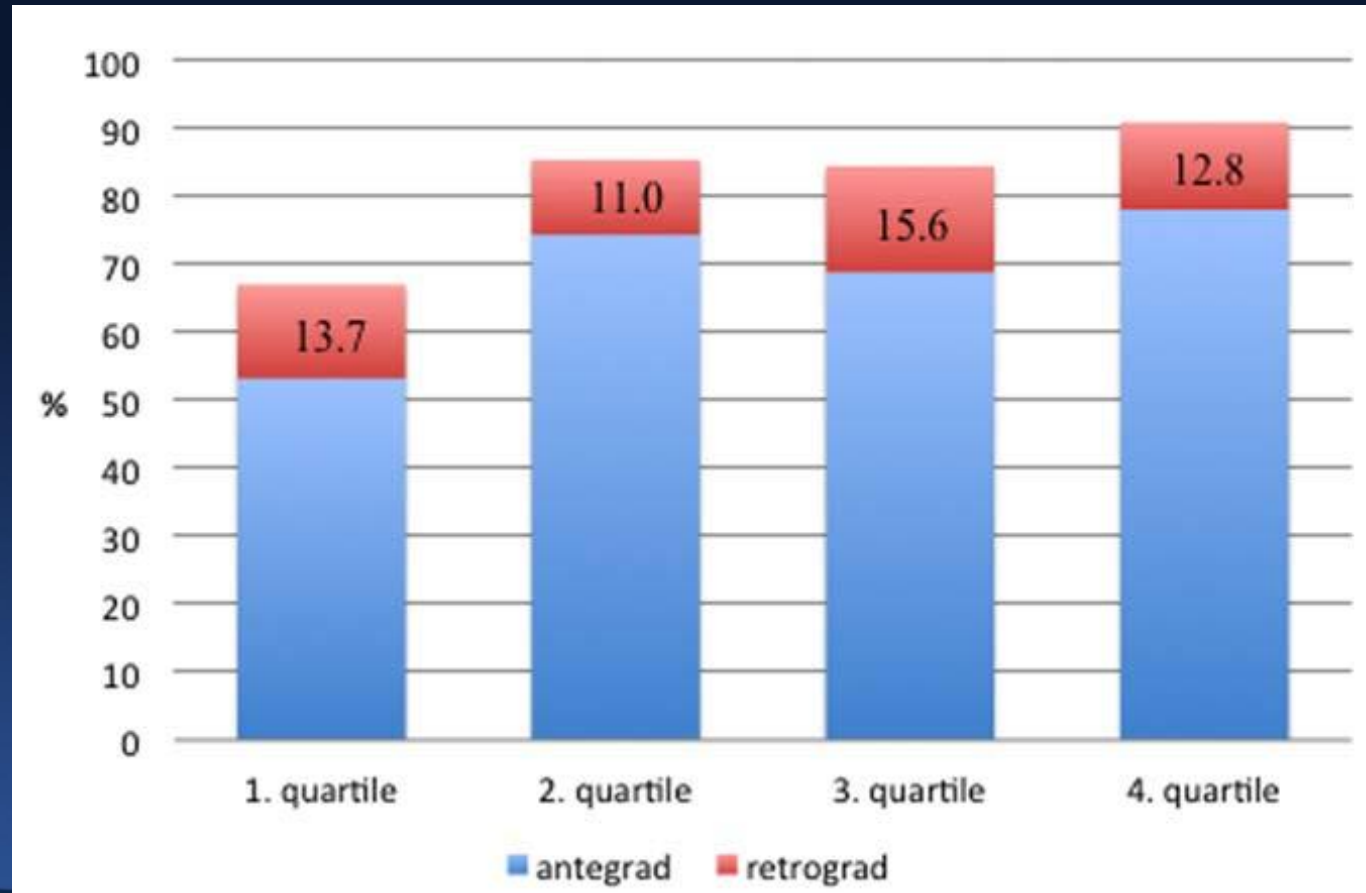


# *Failed PCI, Worsening Angina, 2<sup>nd</sup> Attempt*



# Increasing Success Rate of CTO PCI with Selective Use of Retrograde Approach

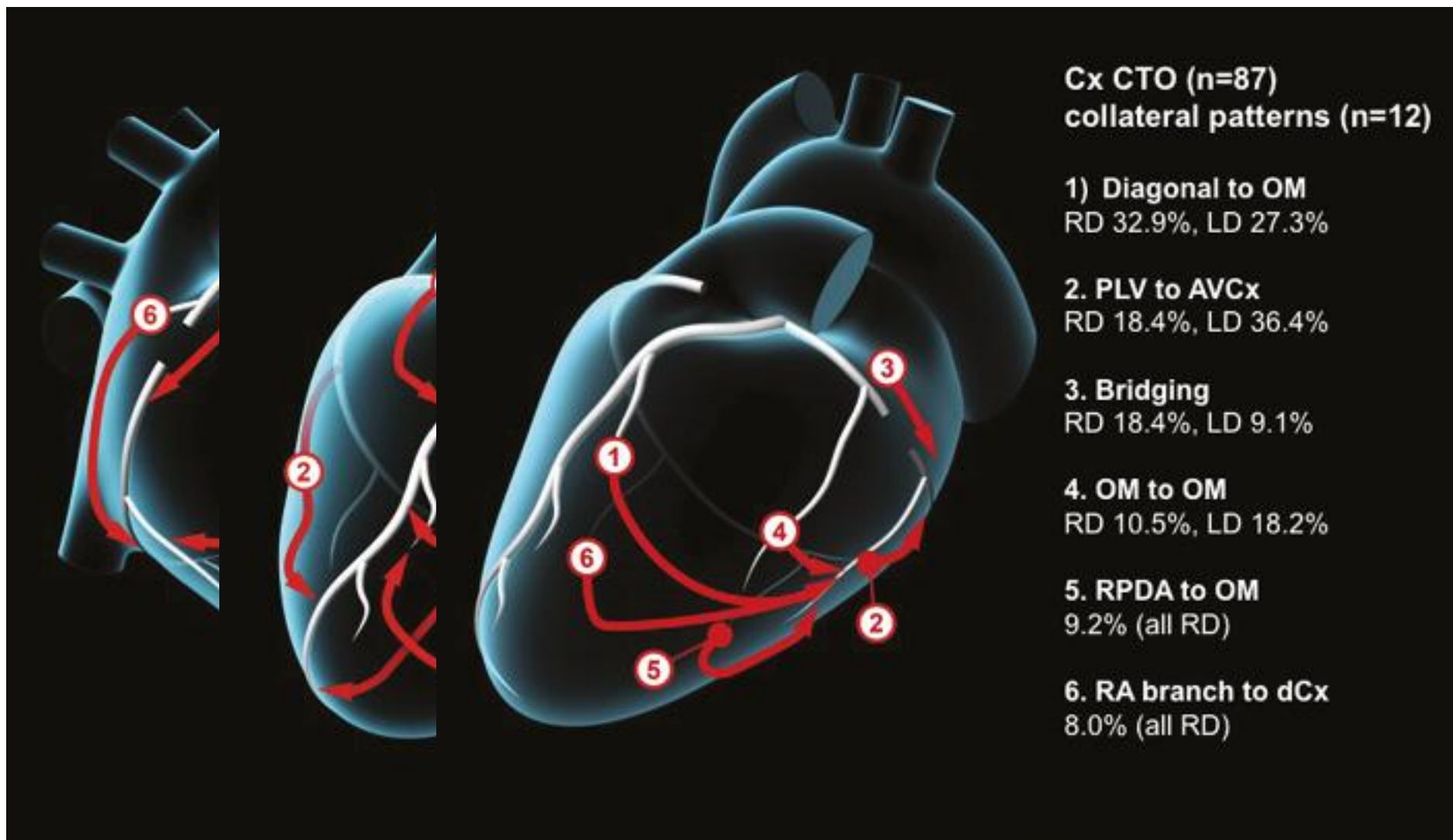
Single operator study (n=436) where retrograde was only used if antegrade failed (18% of the total)



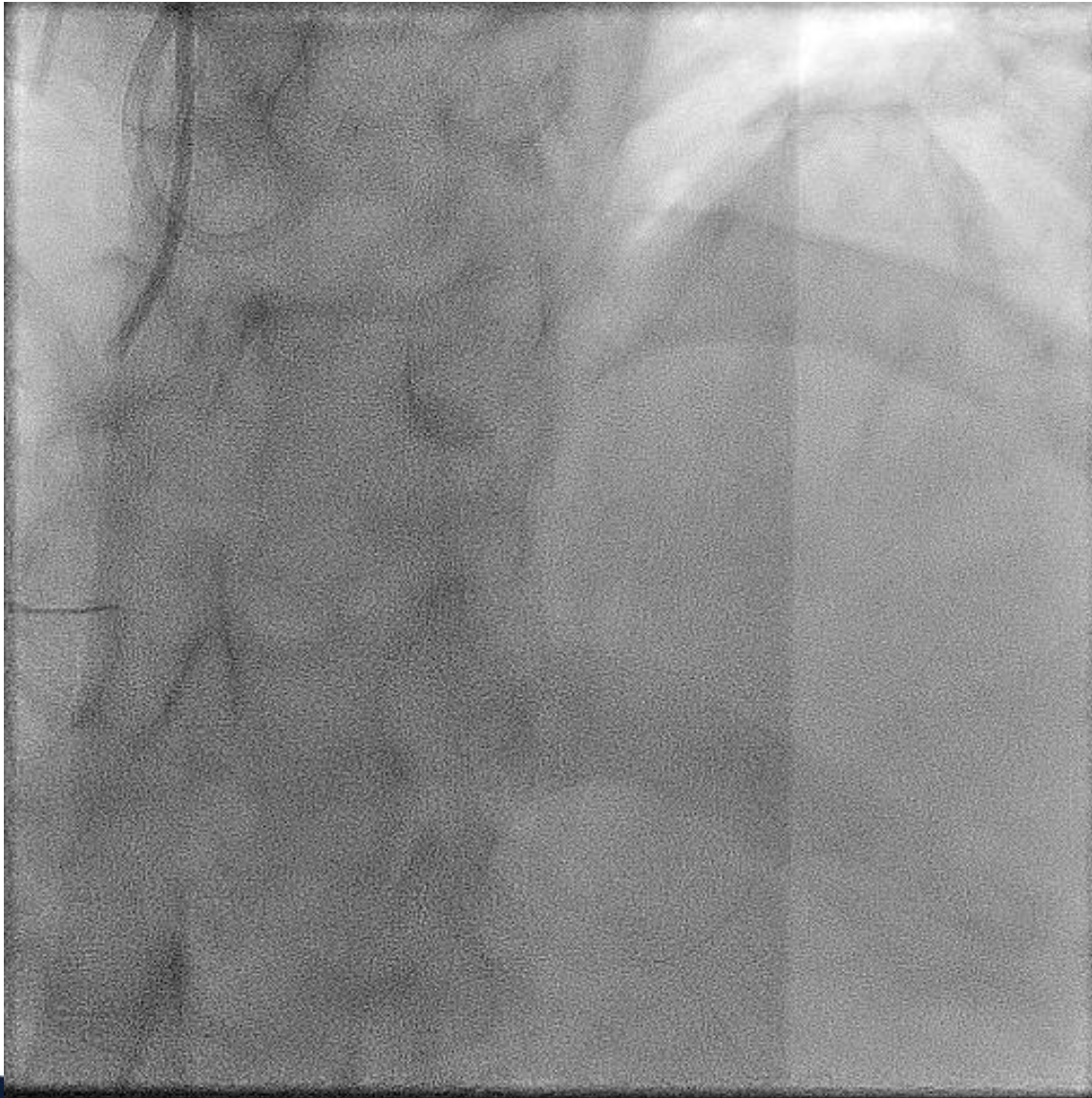


# Characterization of Collateral Circulation of CTOs

519 CTOs at 6 centers in the UK



# CTO of LAD/Diagonal in Patient with Cirrhosis Awaiting Transplant



Prior to CTO  
PCI, patient  
started on  
ASA/Clopidogrel  
x 2 weeks with  
no bleeding

# Failed Antegrade Wire Escalation / Dissection-Reentry

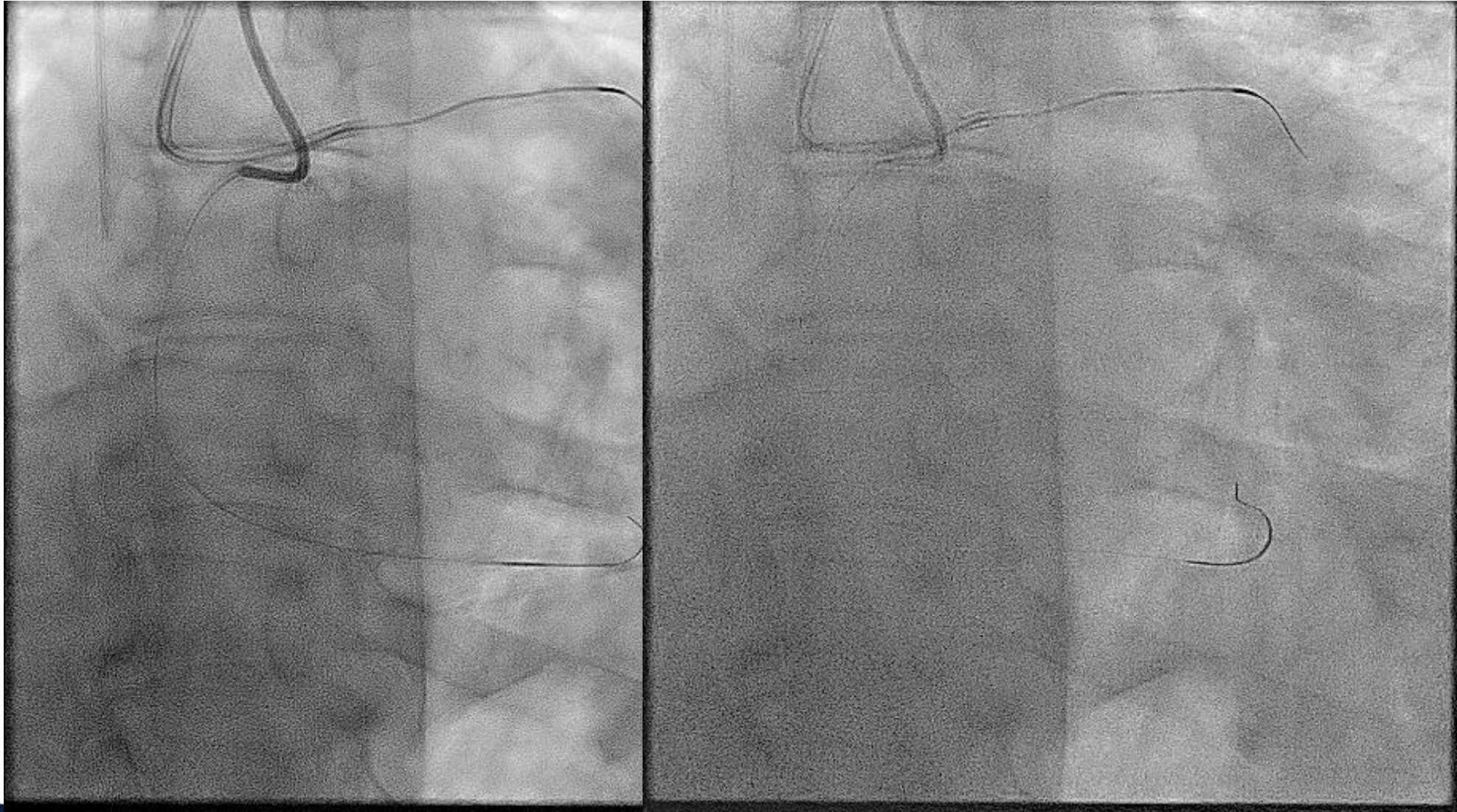
Bi-radial access

- 7.5 Fr Sheathless Guide (antegrade)
- 6-in-5 Sheath with 6Fr Guide (retrograde)



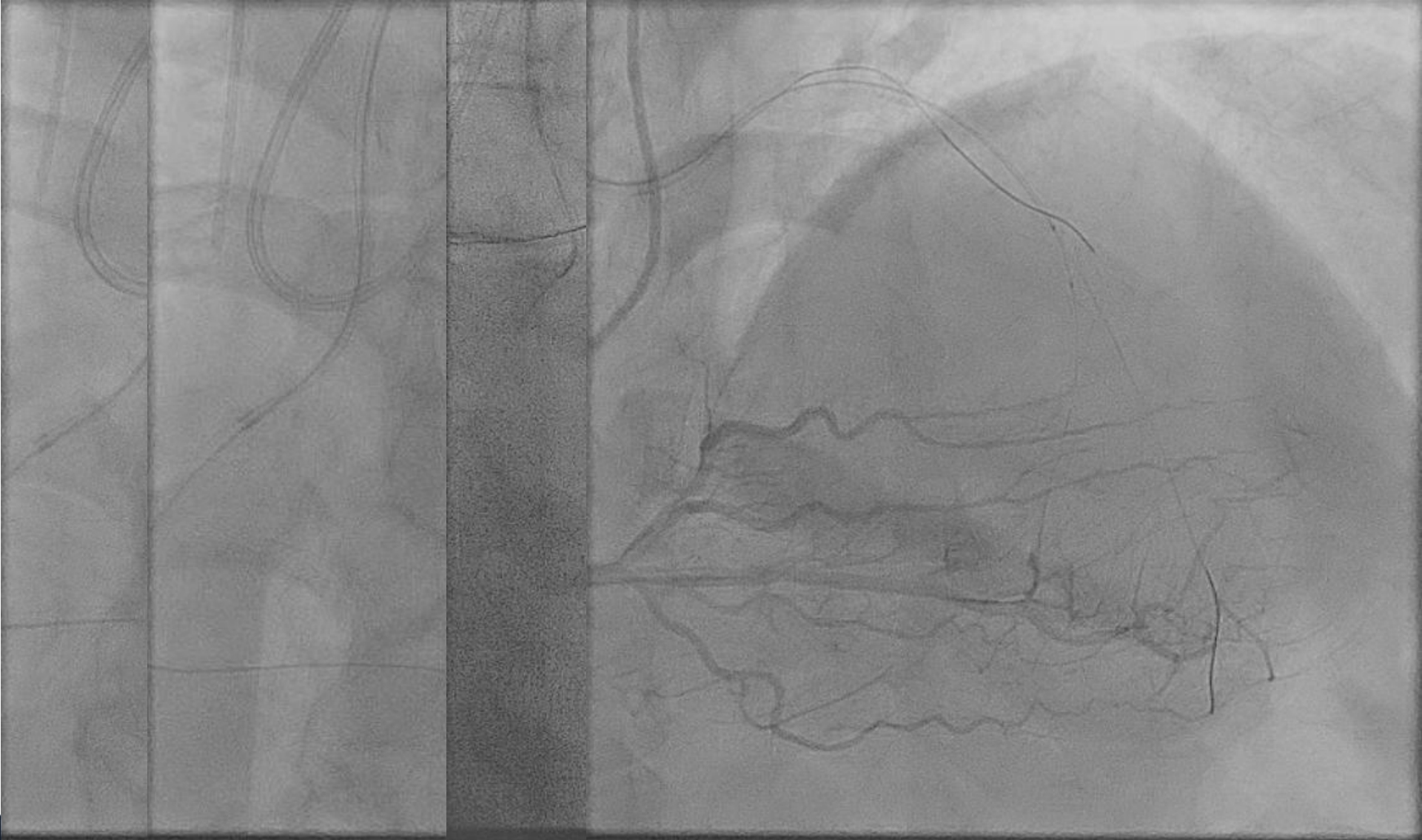


# Retrograde Septal Crossing

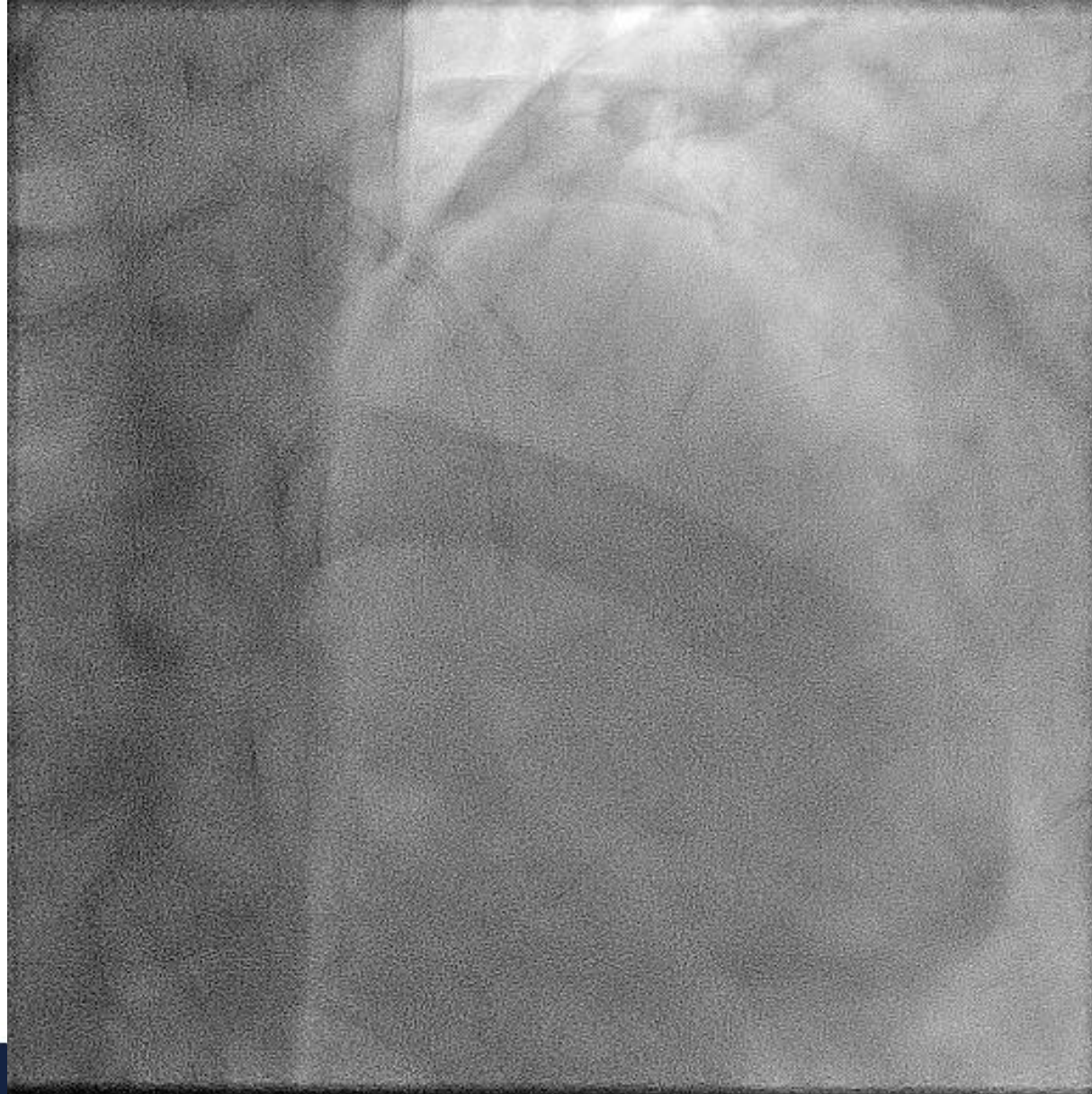




# Reverse CART/Externalization/Wire Delivery



# Final Angiography

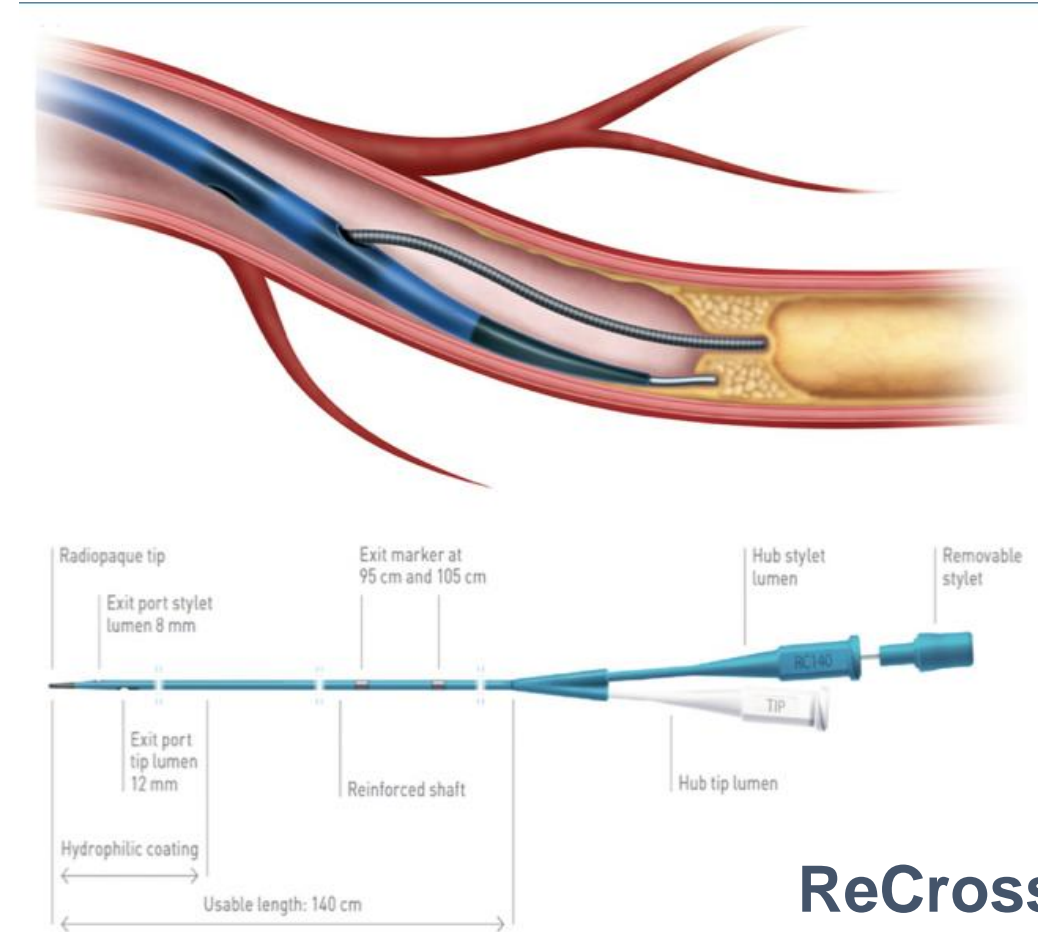
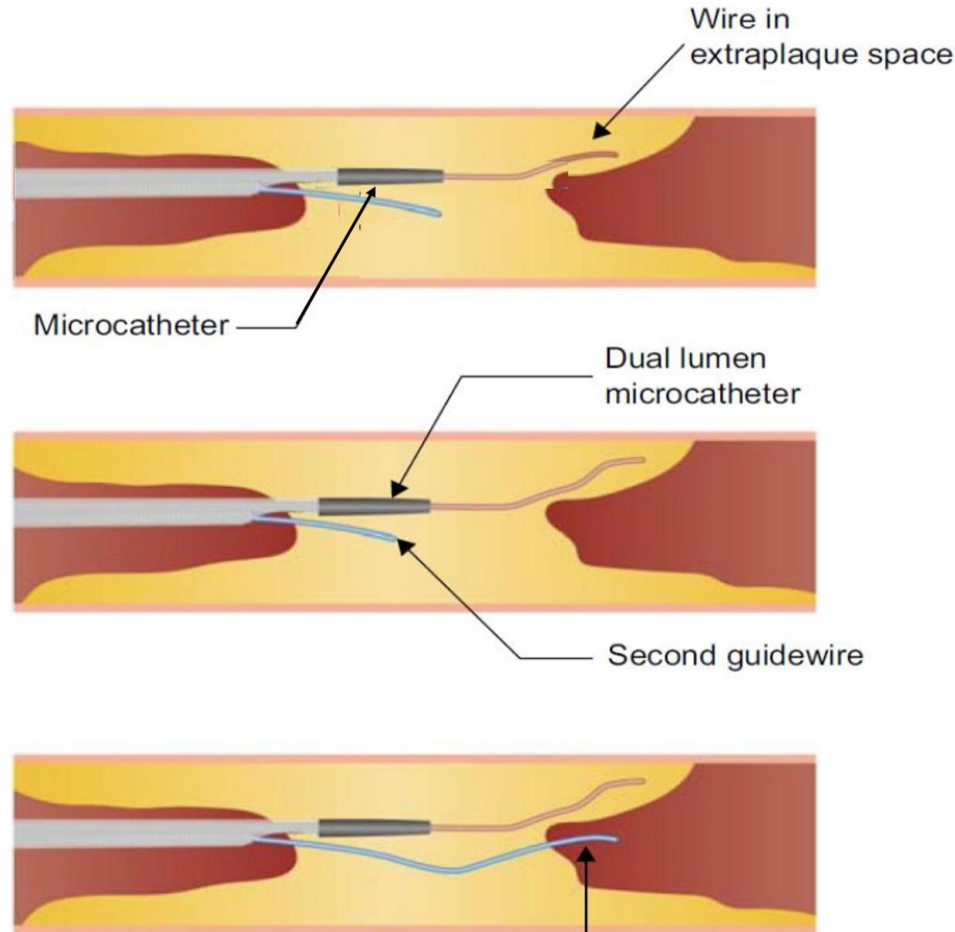


# Recent Evolution in Antegrade Technique

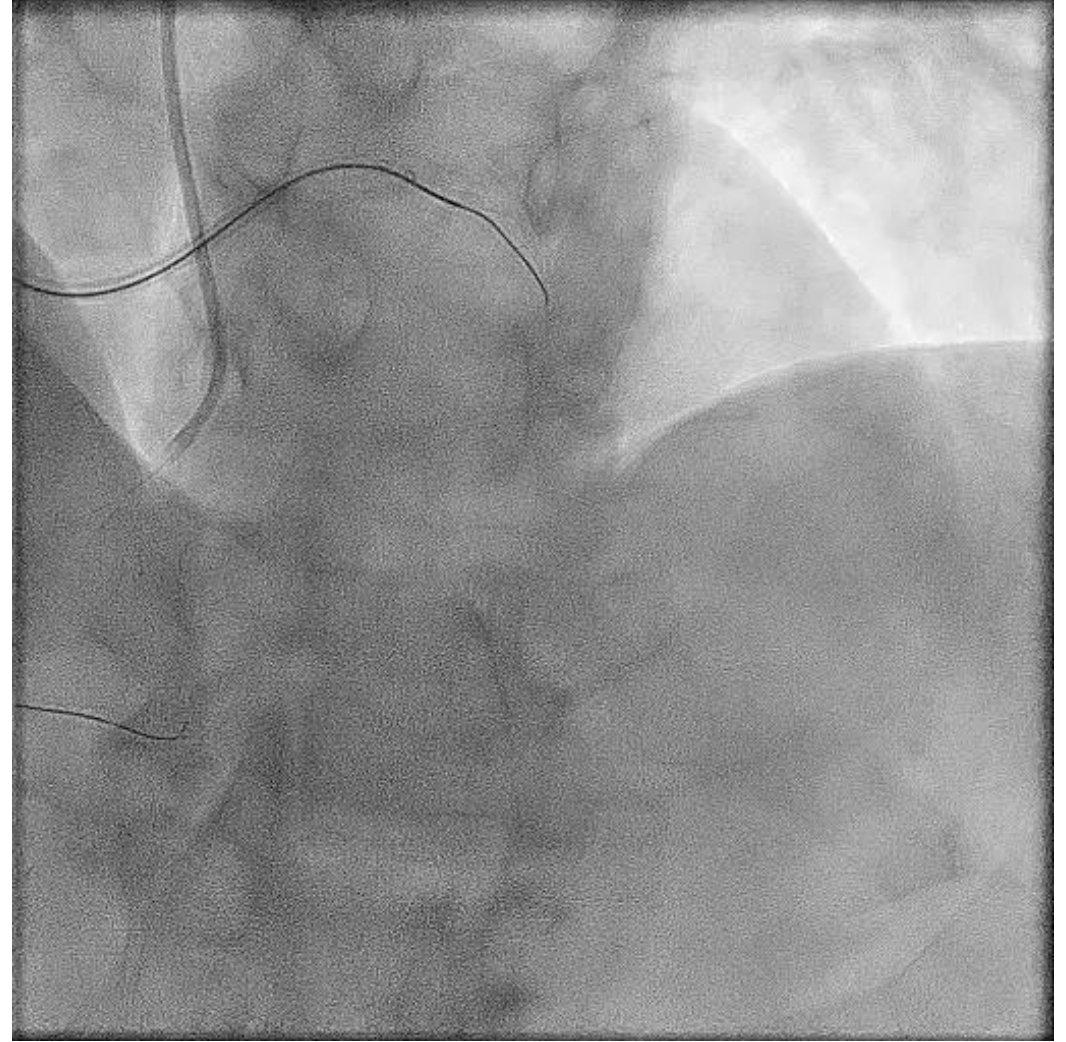
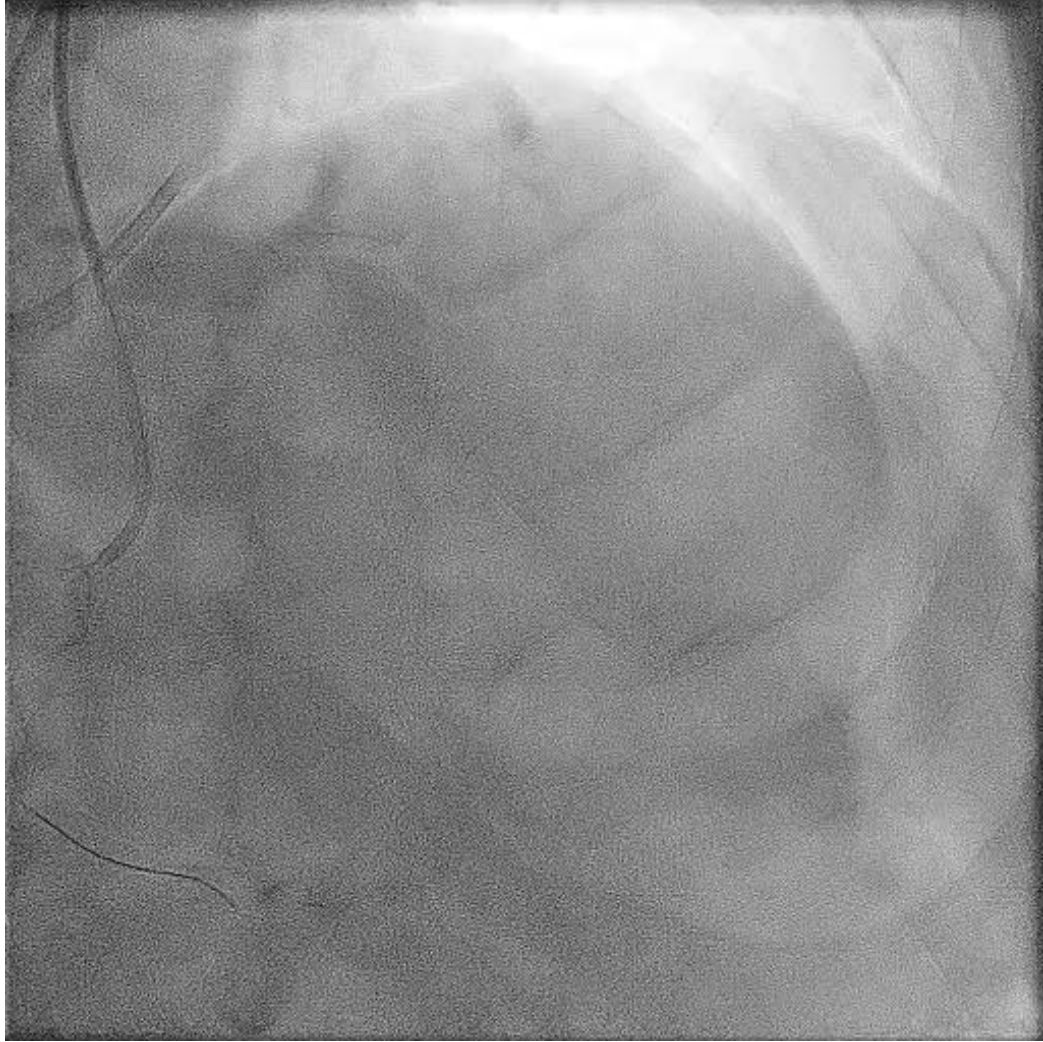
❖ Dual Lumen Microcatheter (DLMC) facilitated  
Parallel Wiring (PW) or Antegrade Dissection Re-entry (ADR)



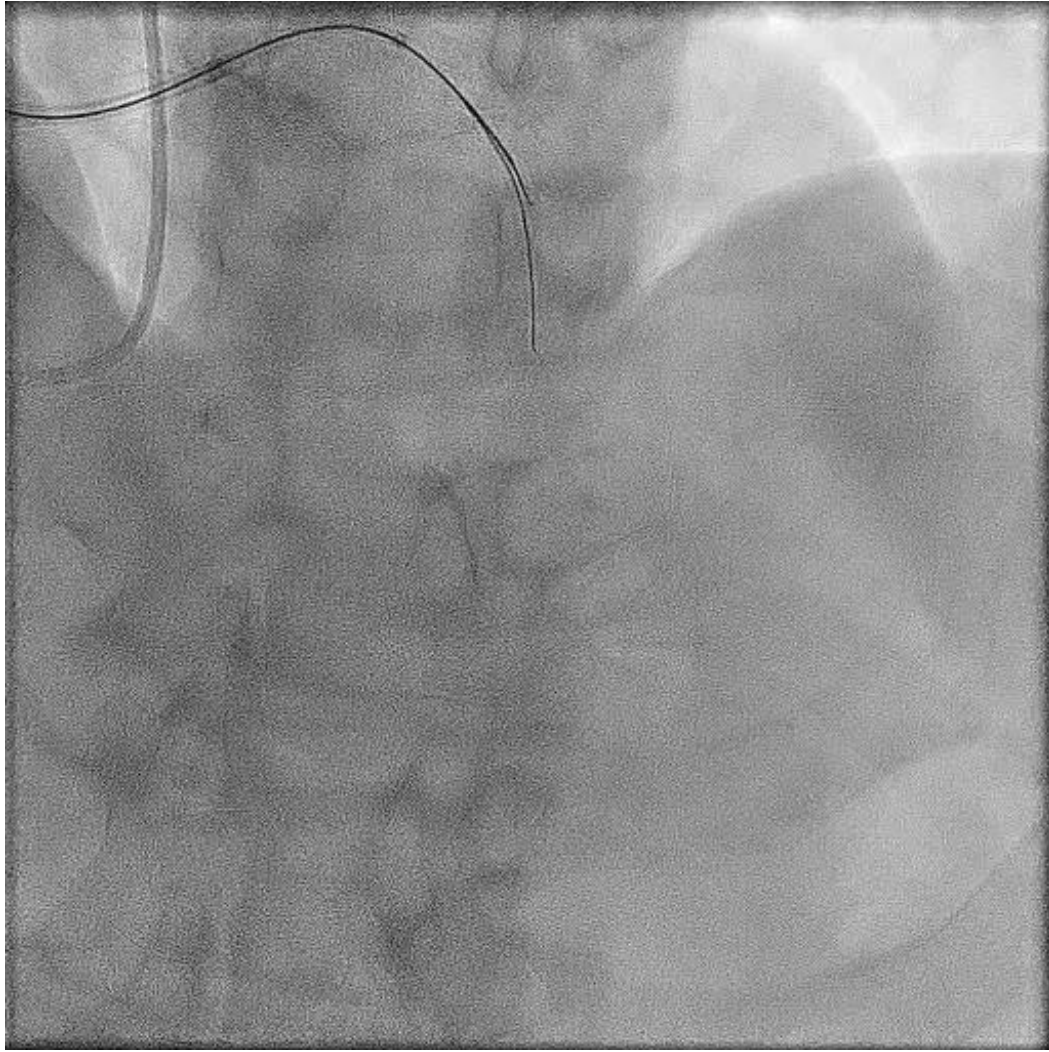
# DLMC Facilitated PW and ADR



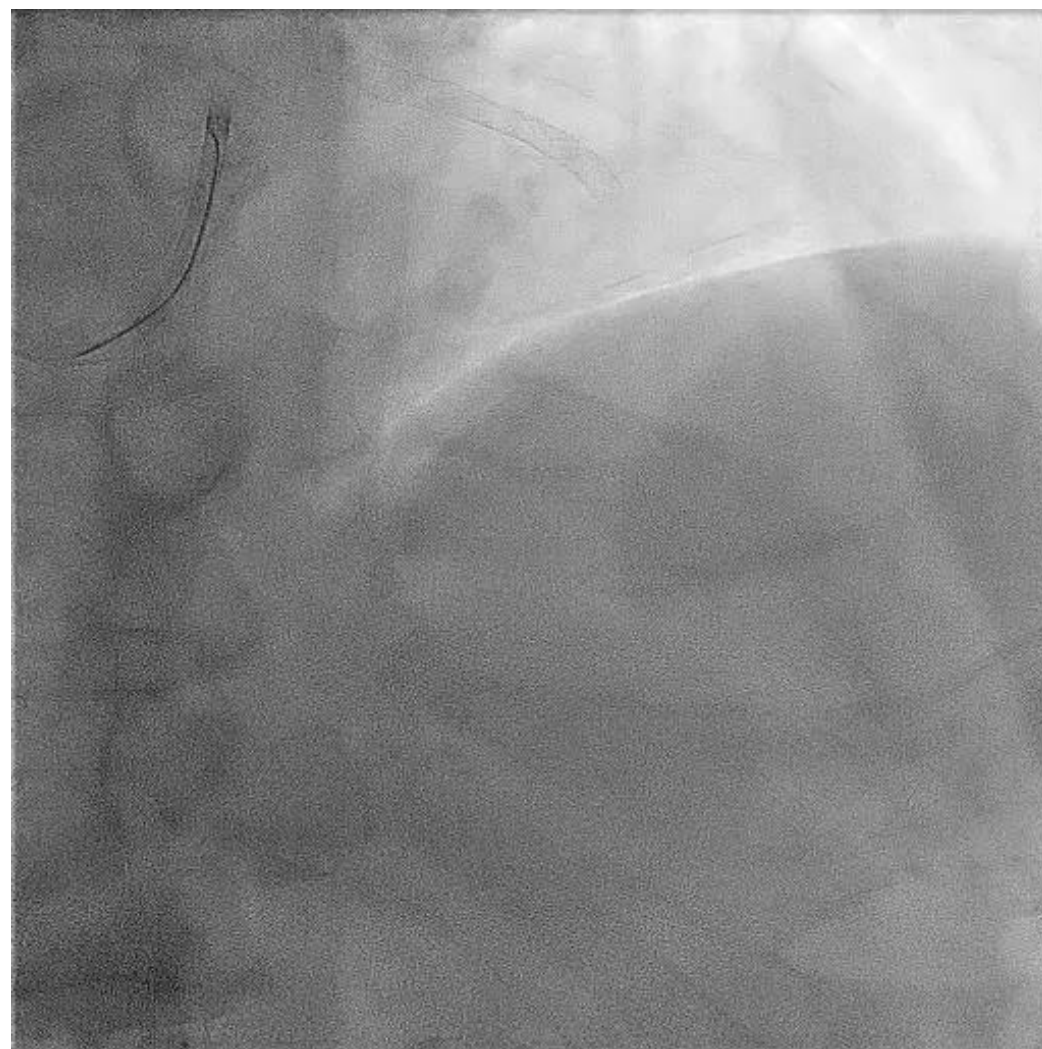
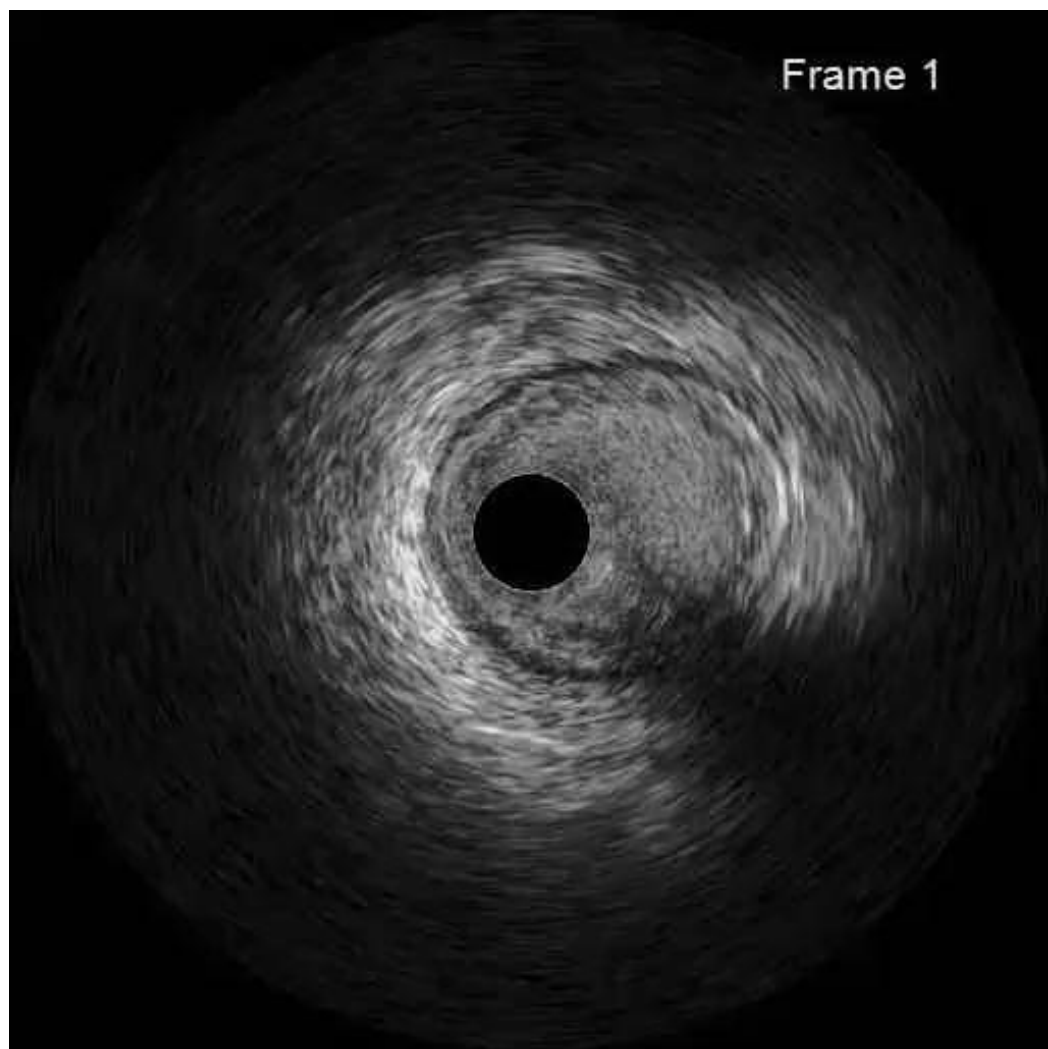






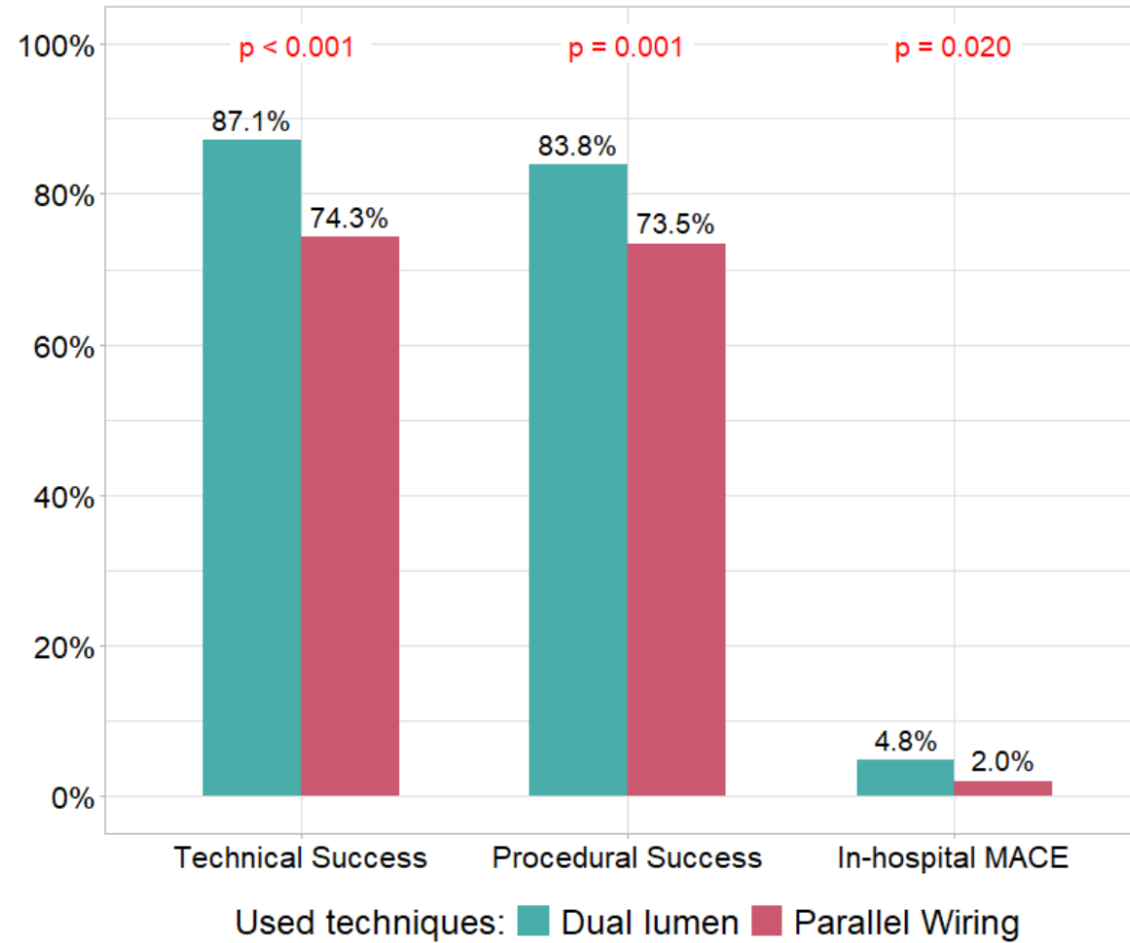








# DLMC Facilitated PW

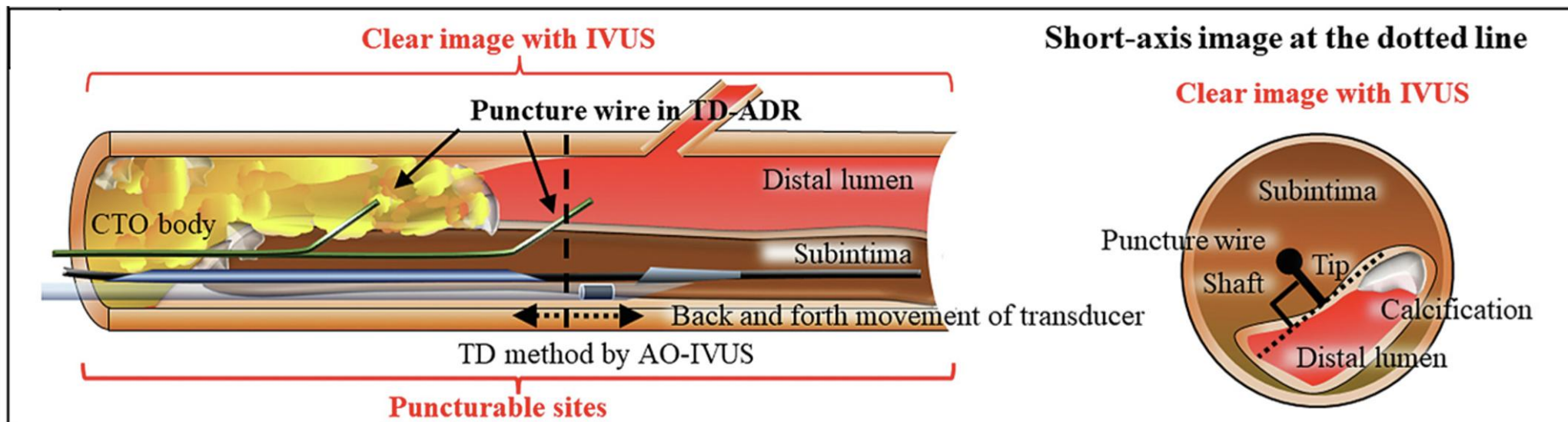


Single vs DLMC PW in CTO PCI: PROGRESS-CTO Registry  
Catheter Cardiovasc Interv. May 2025

# Recent Evolution in Antegrade Technique

❖ IVUS guided Wiring / Re-Entry and TD-HDR

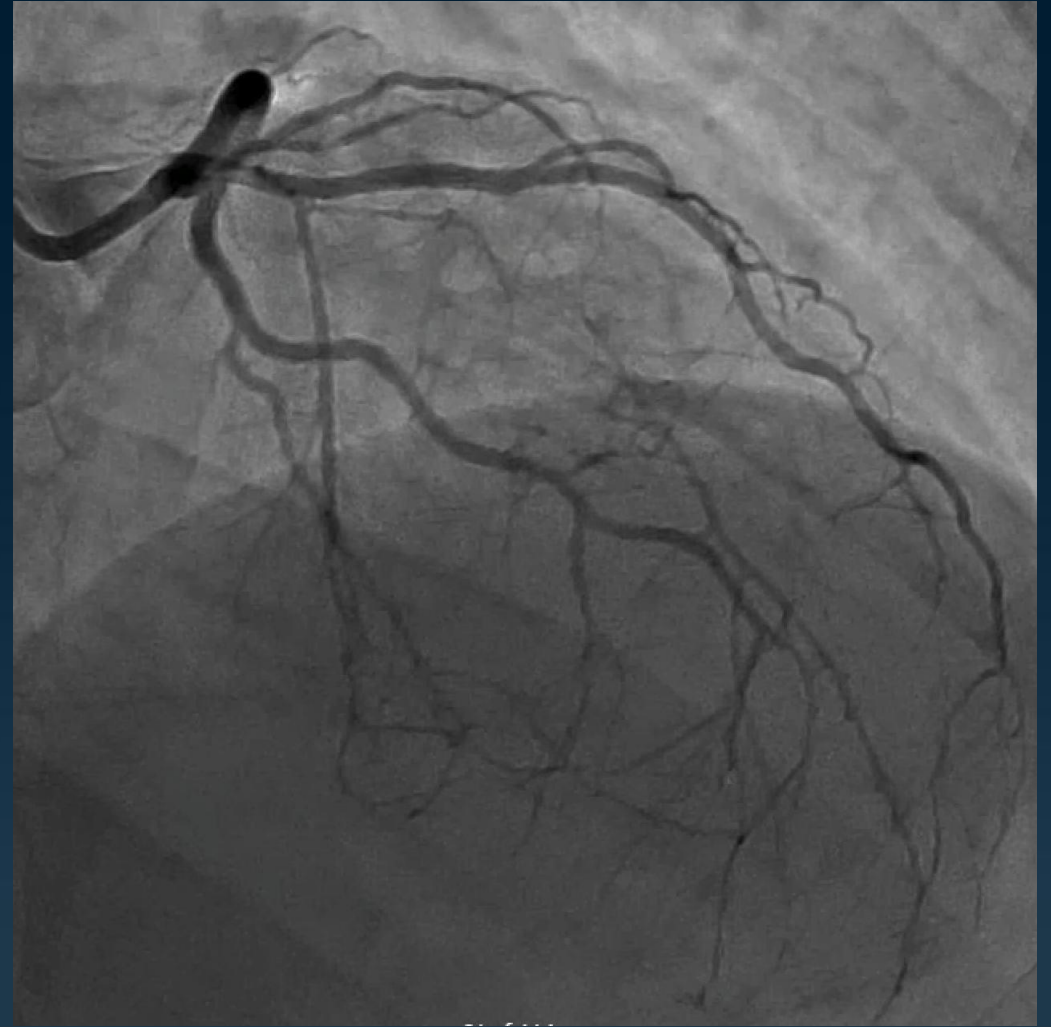
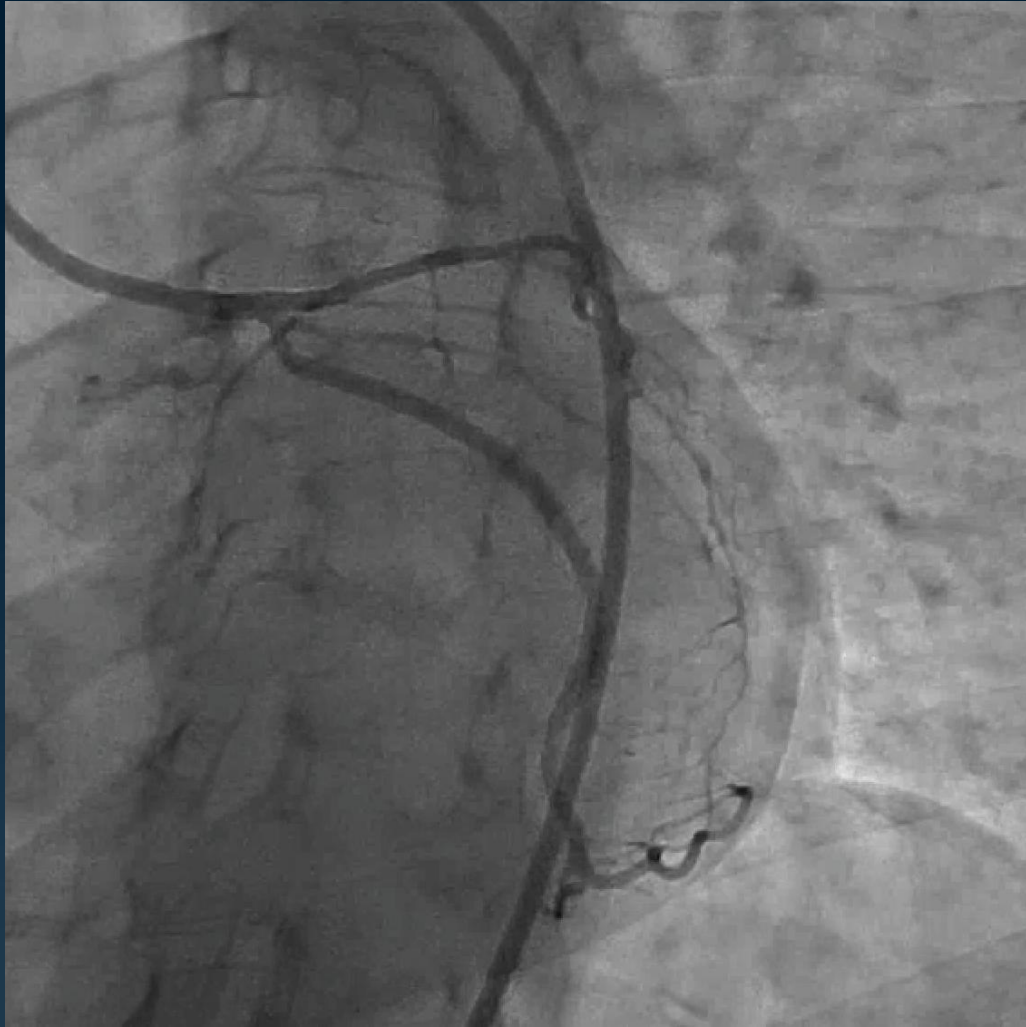
# IVUS guided AW and ADR



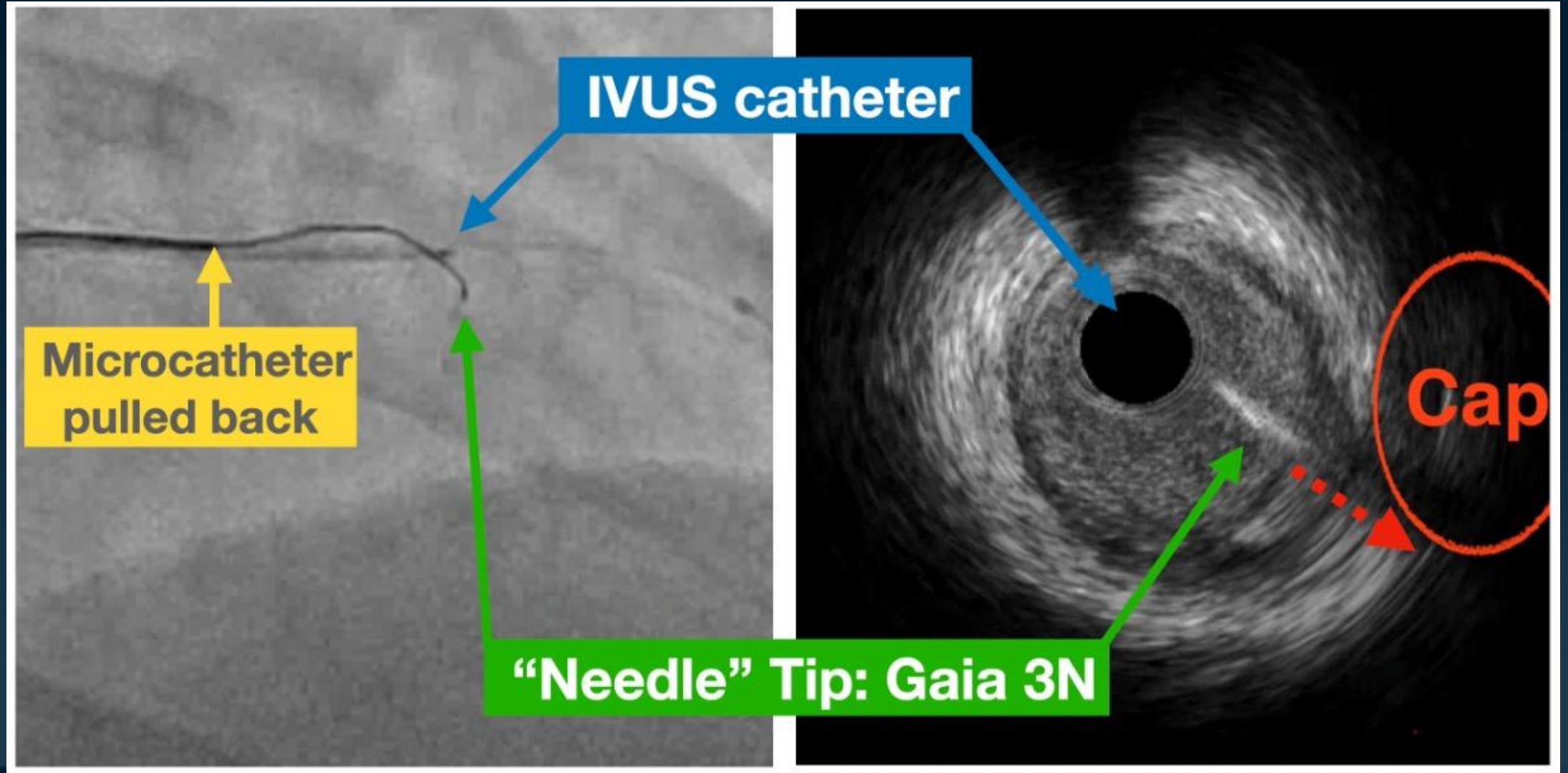
Tanaka K, et al. JACC: Asia. 2024;4(5):359-372.



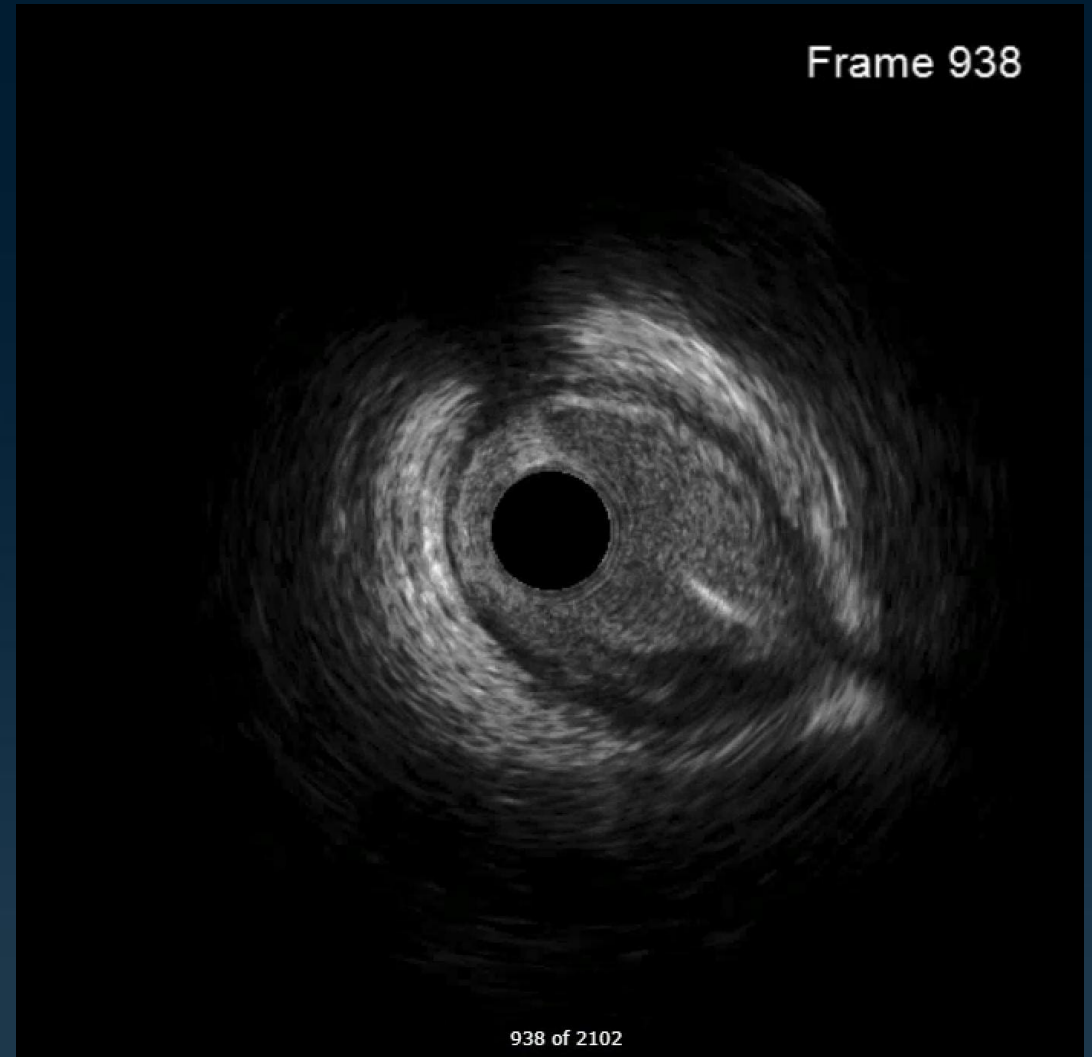
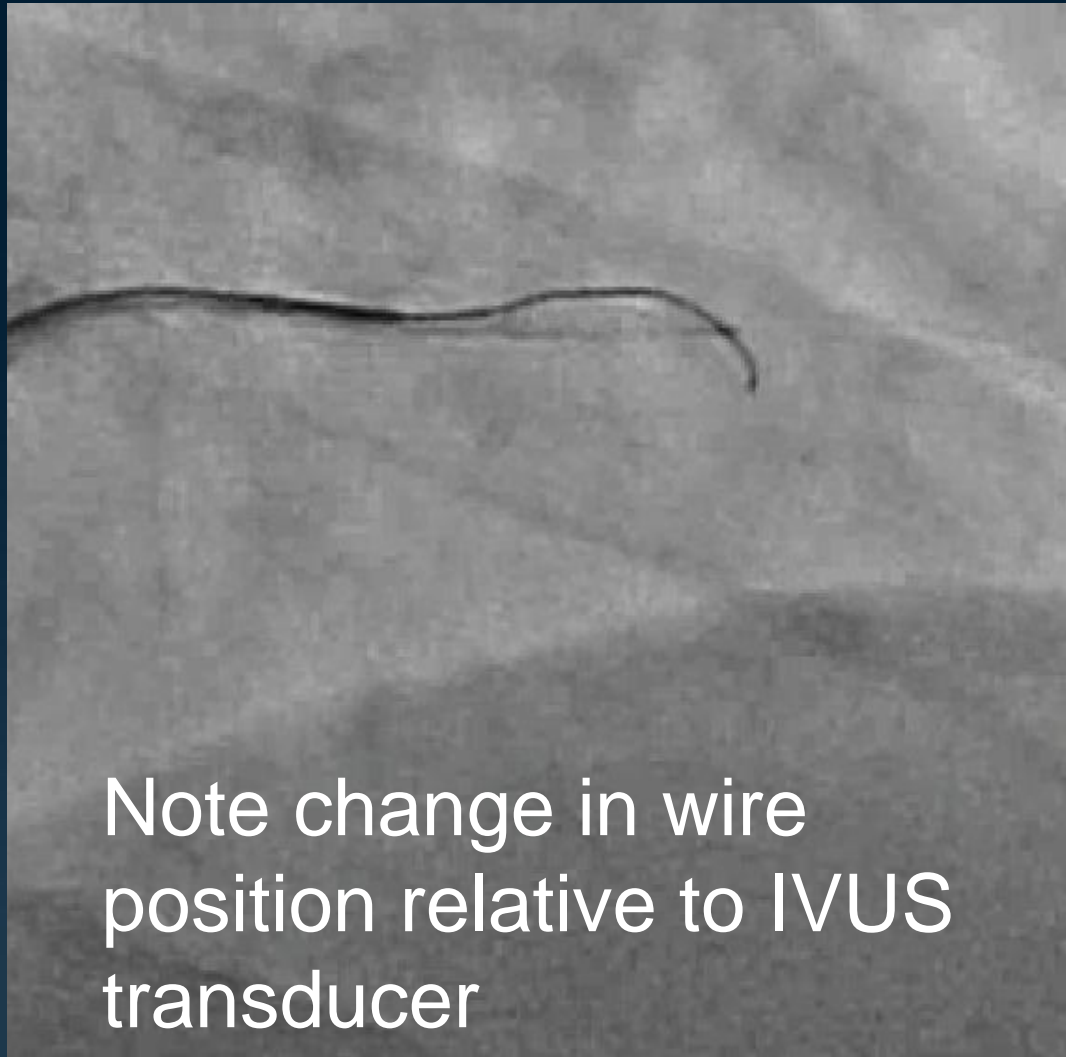
# Baseline Angiogram



# TD-HDR Set Up

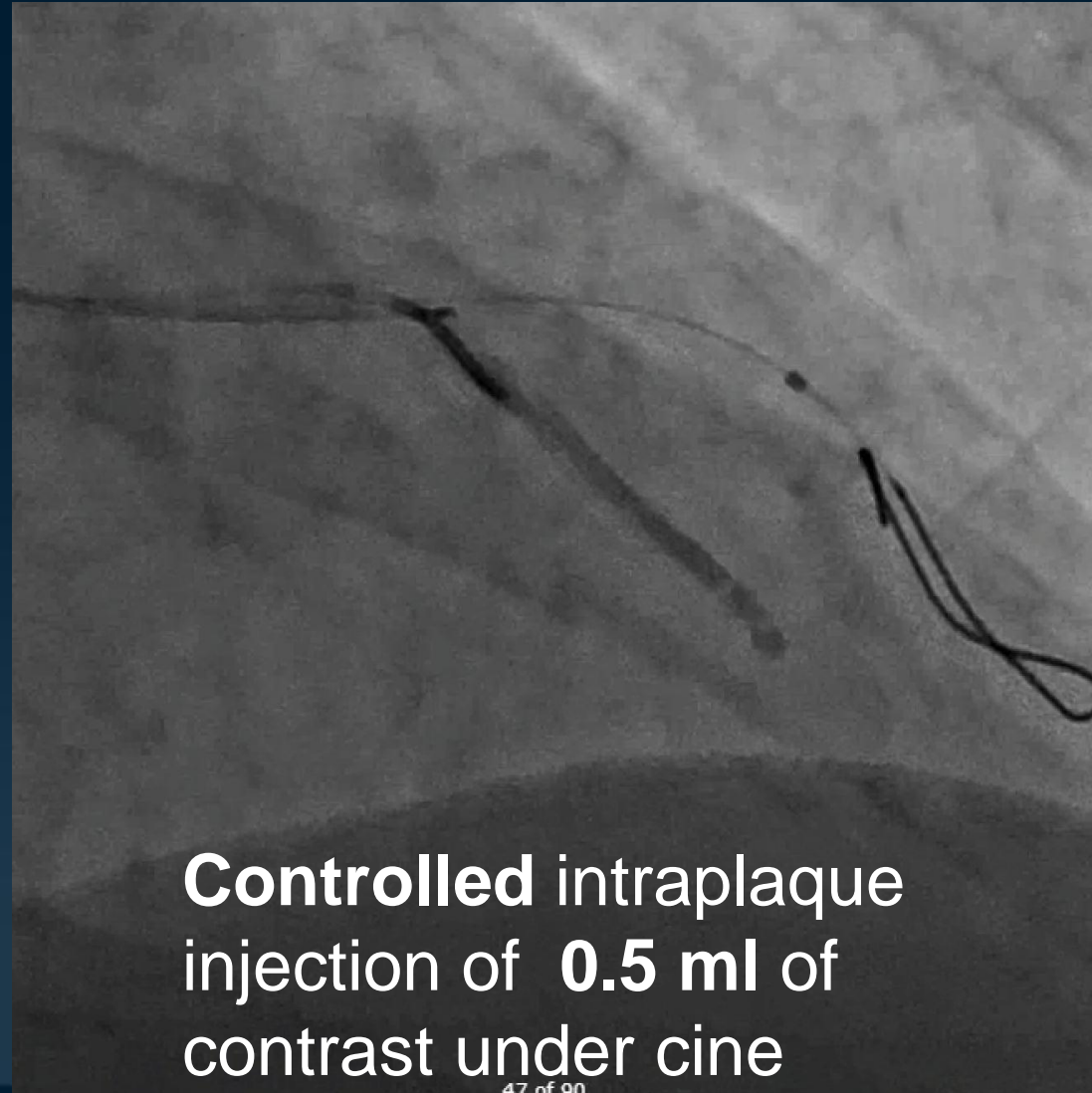


# Step 1: TD Proximal Cap Puncture





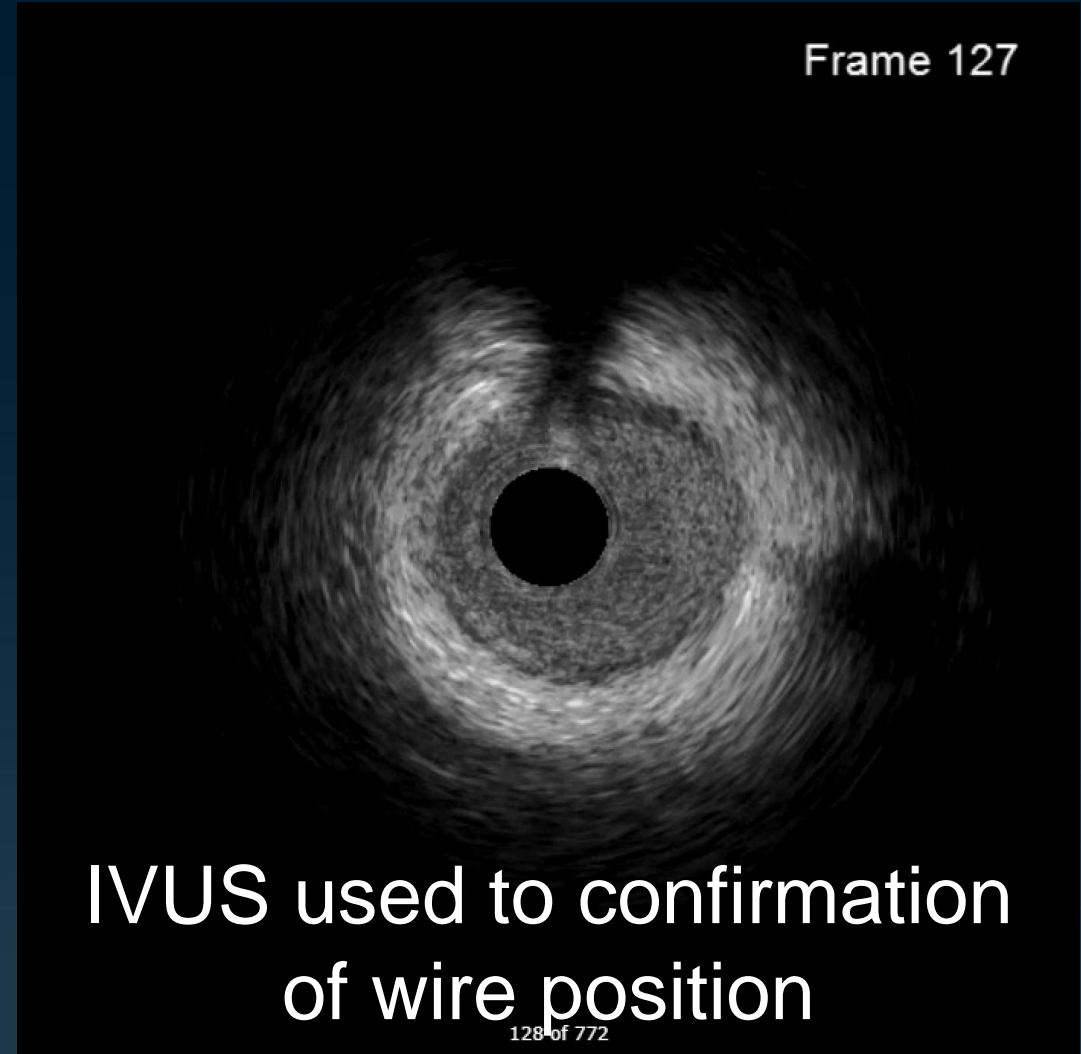
# Step 2: HDR at Proximal Cap



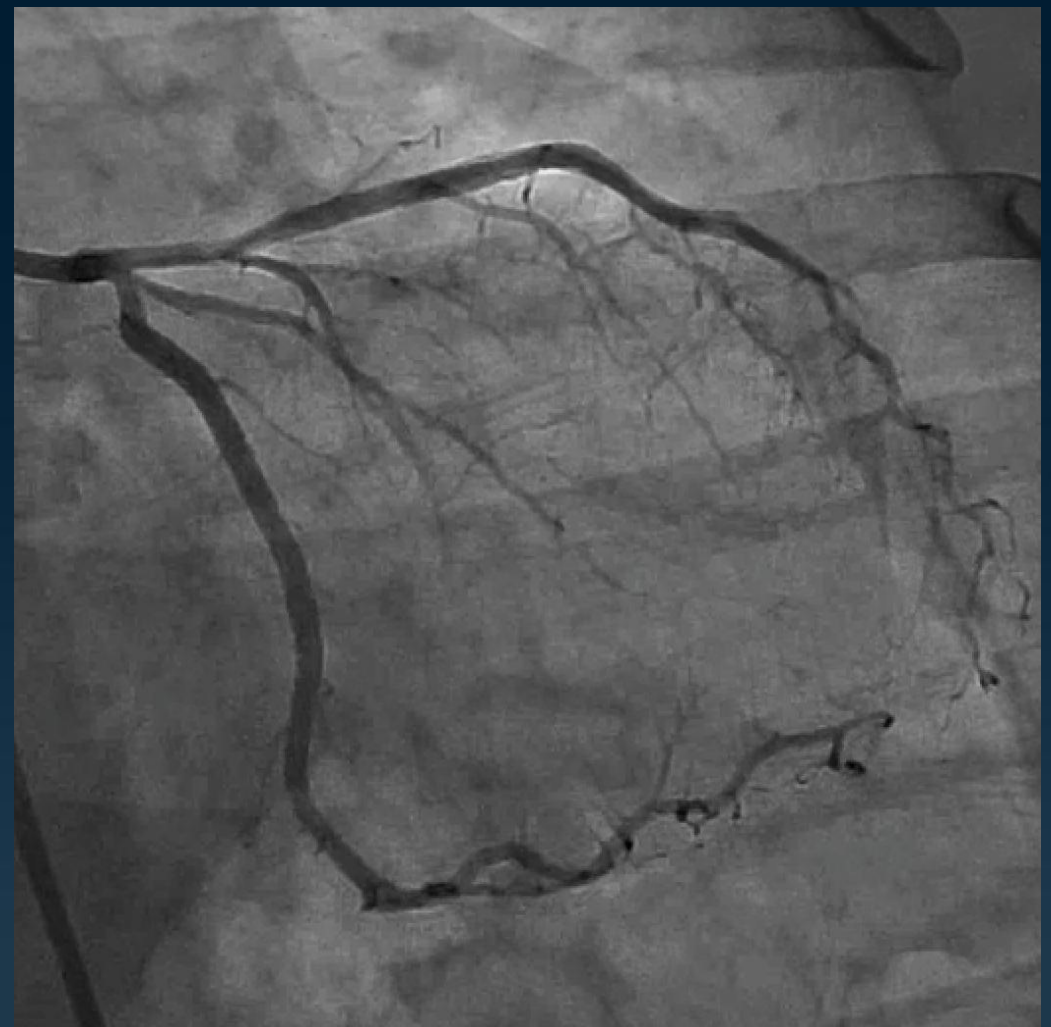
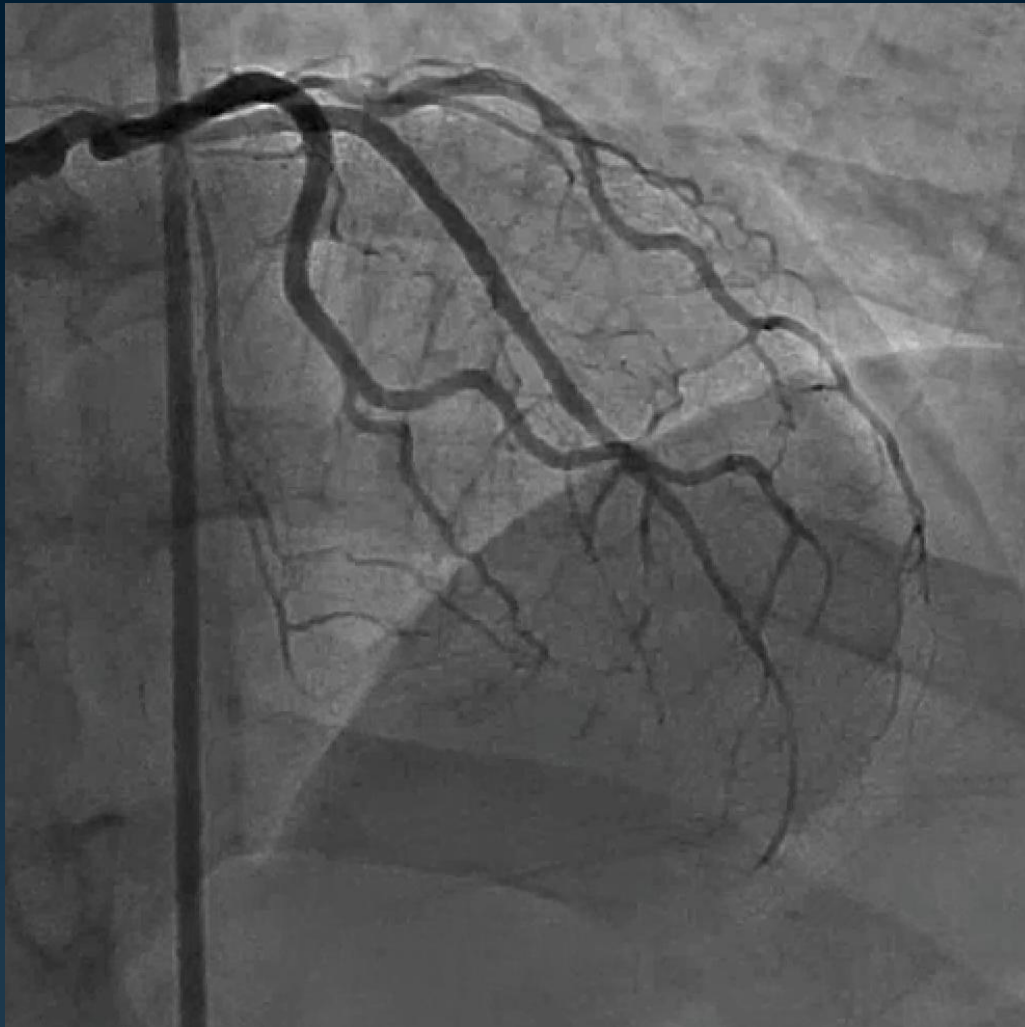
**Controlled** intraplaque  
injection of **0.5 ml** of  
contrast under cine

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# Step 3: CTO crossed with a PJW (MG)



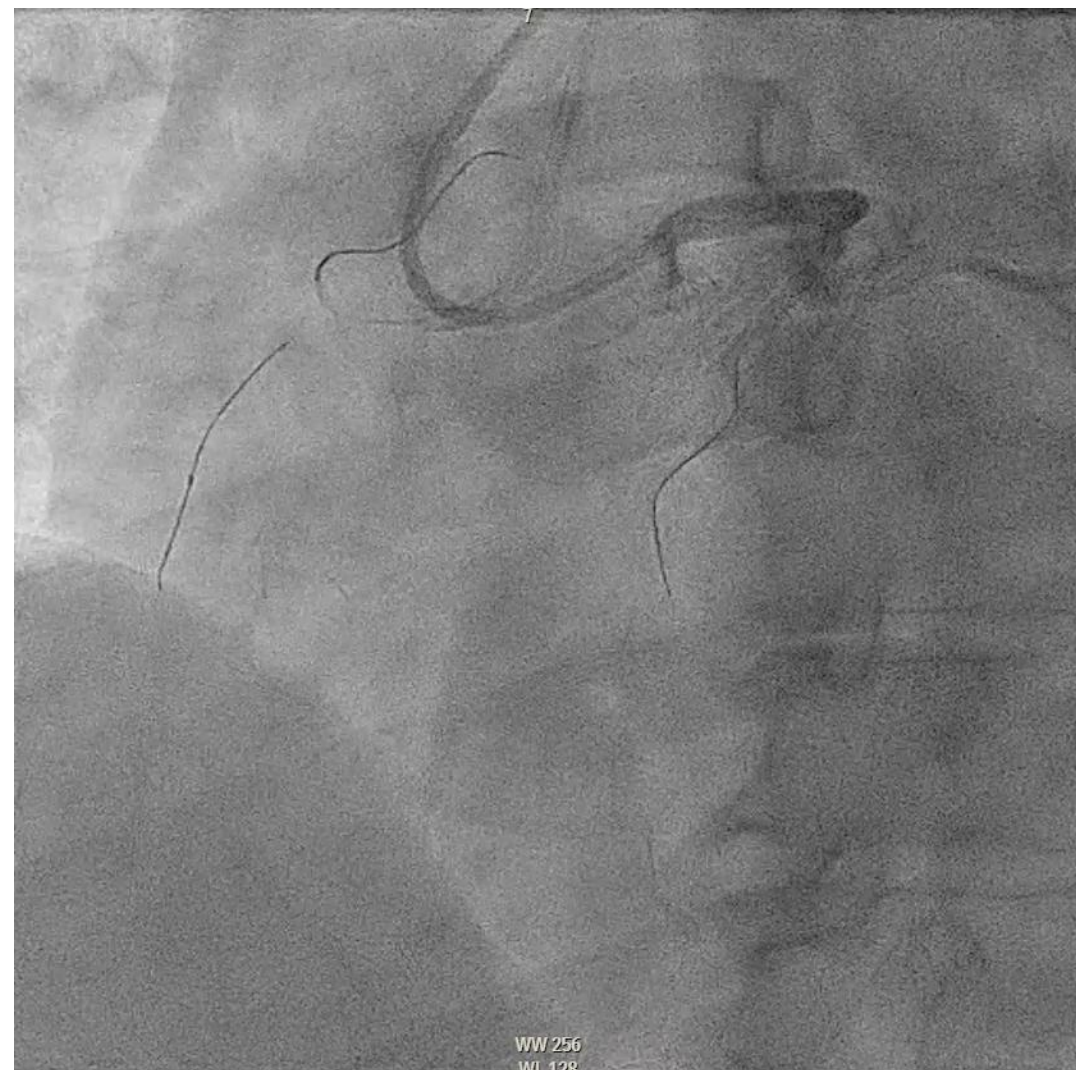
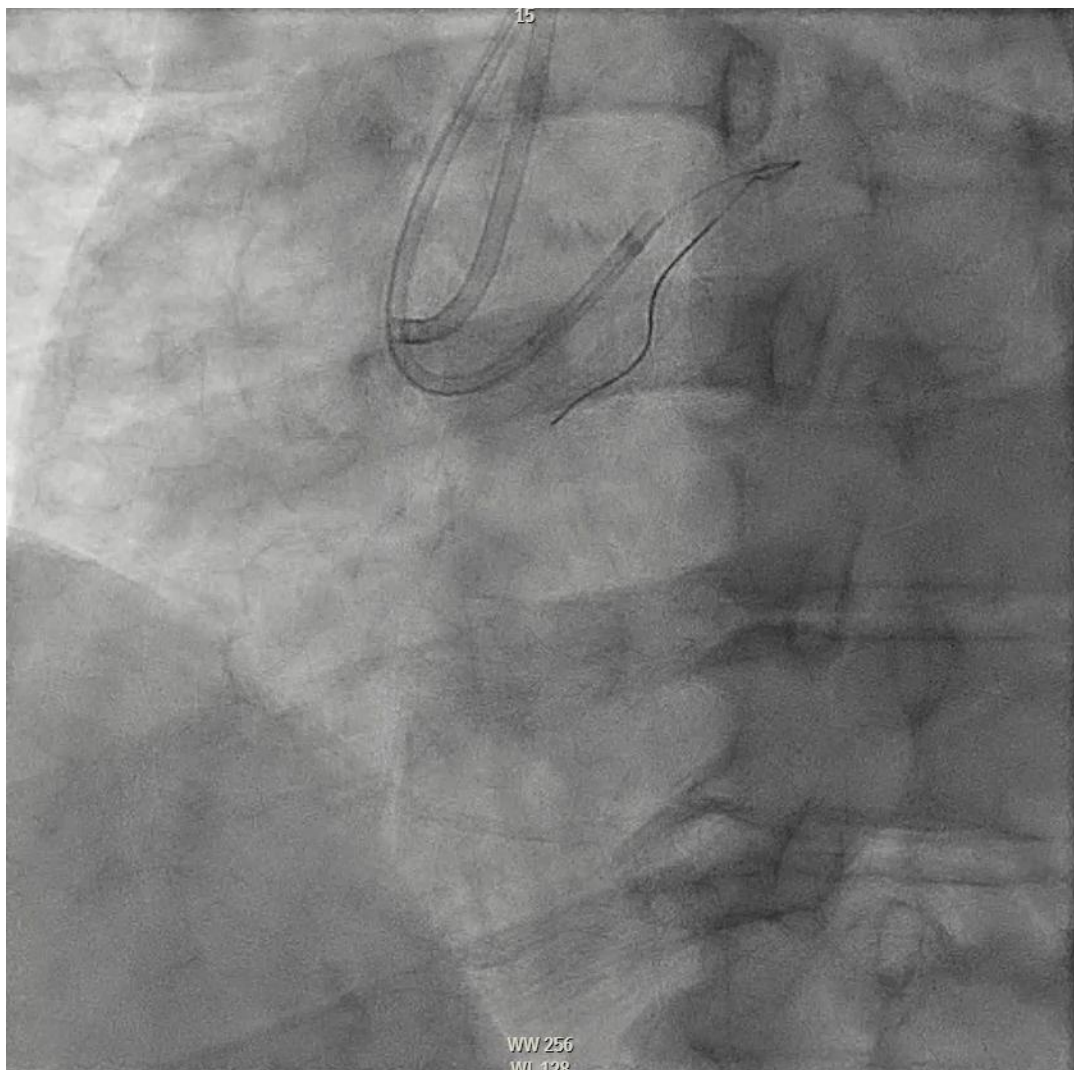
# Final Result After LAD Stent Placement

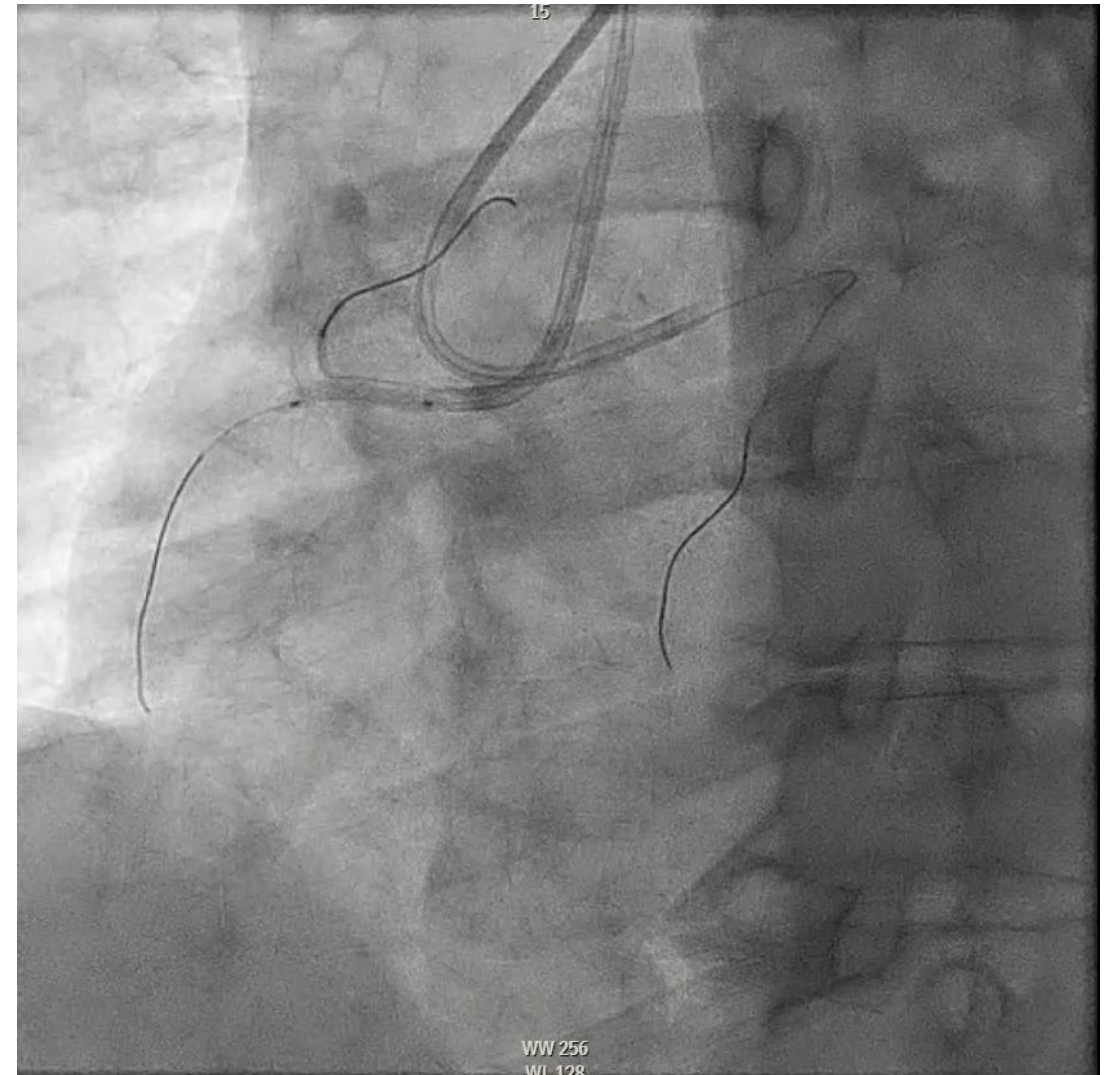
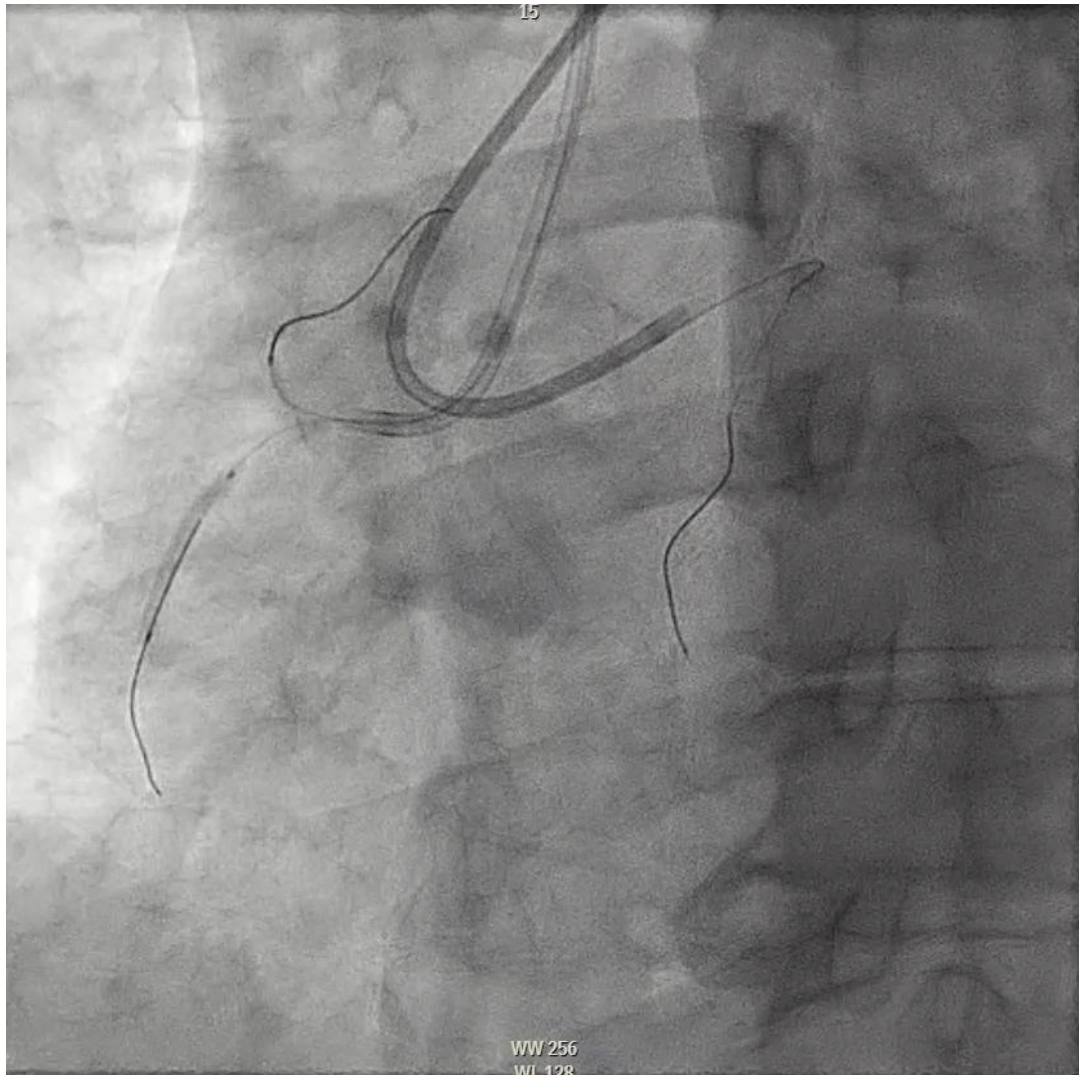




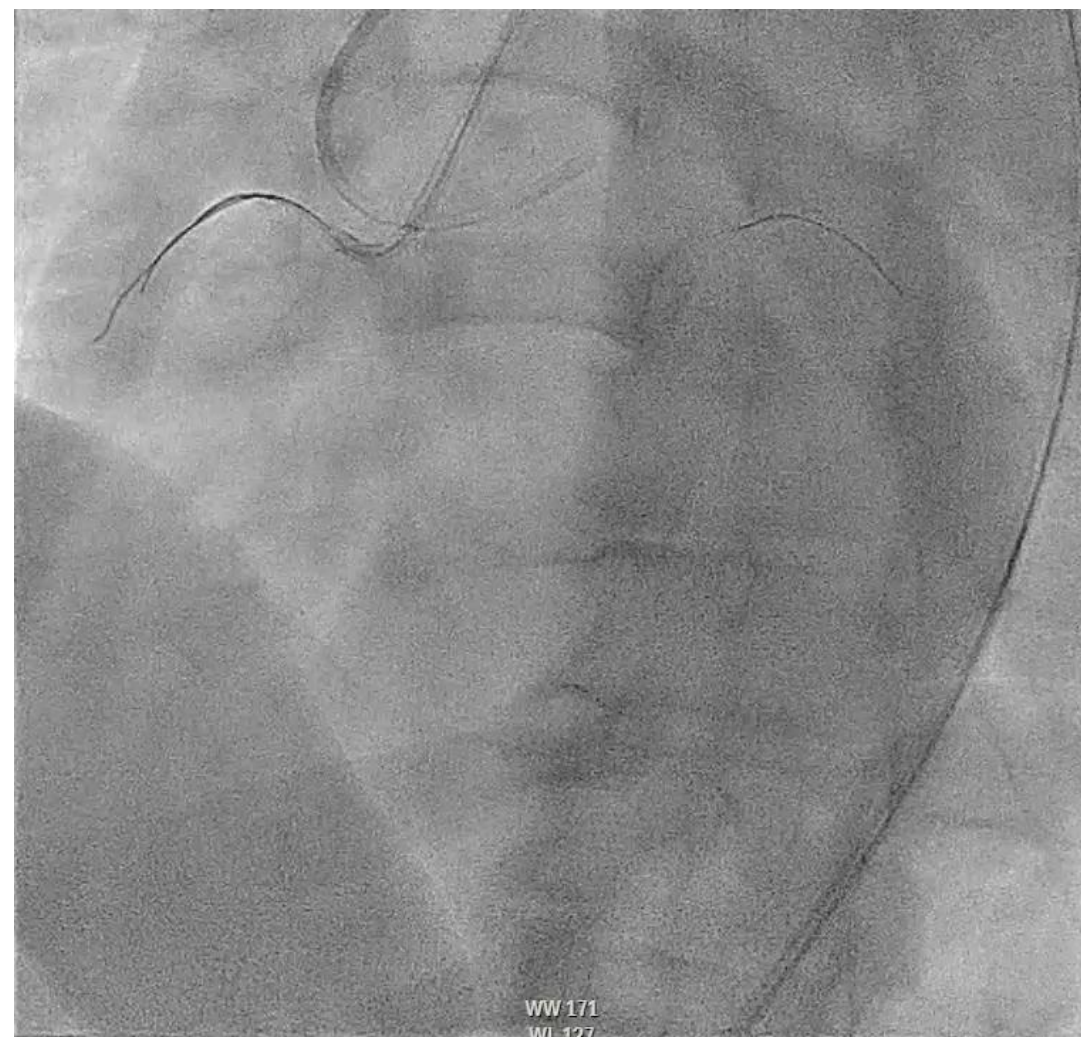
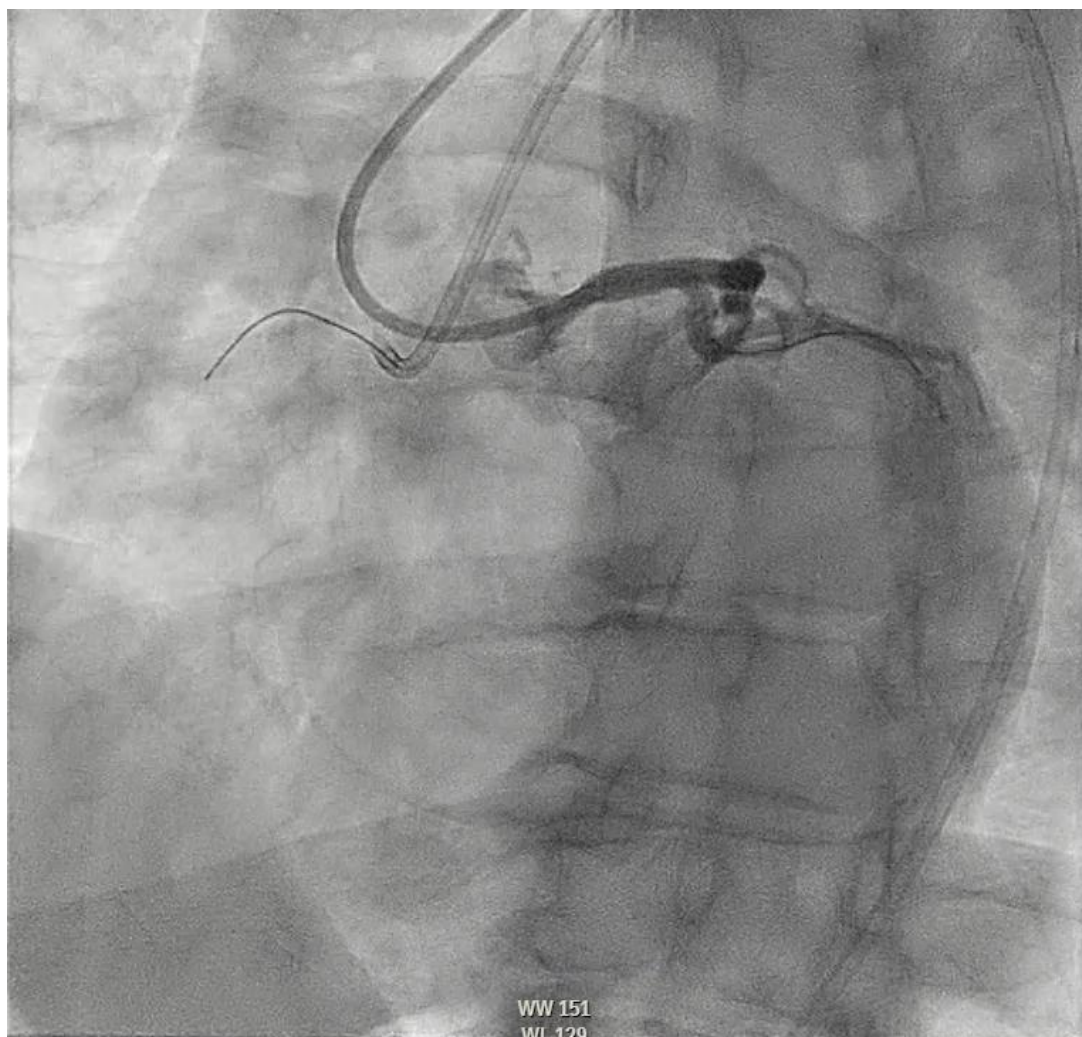
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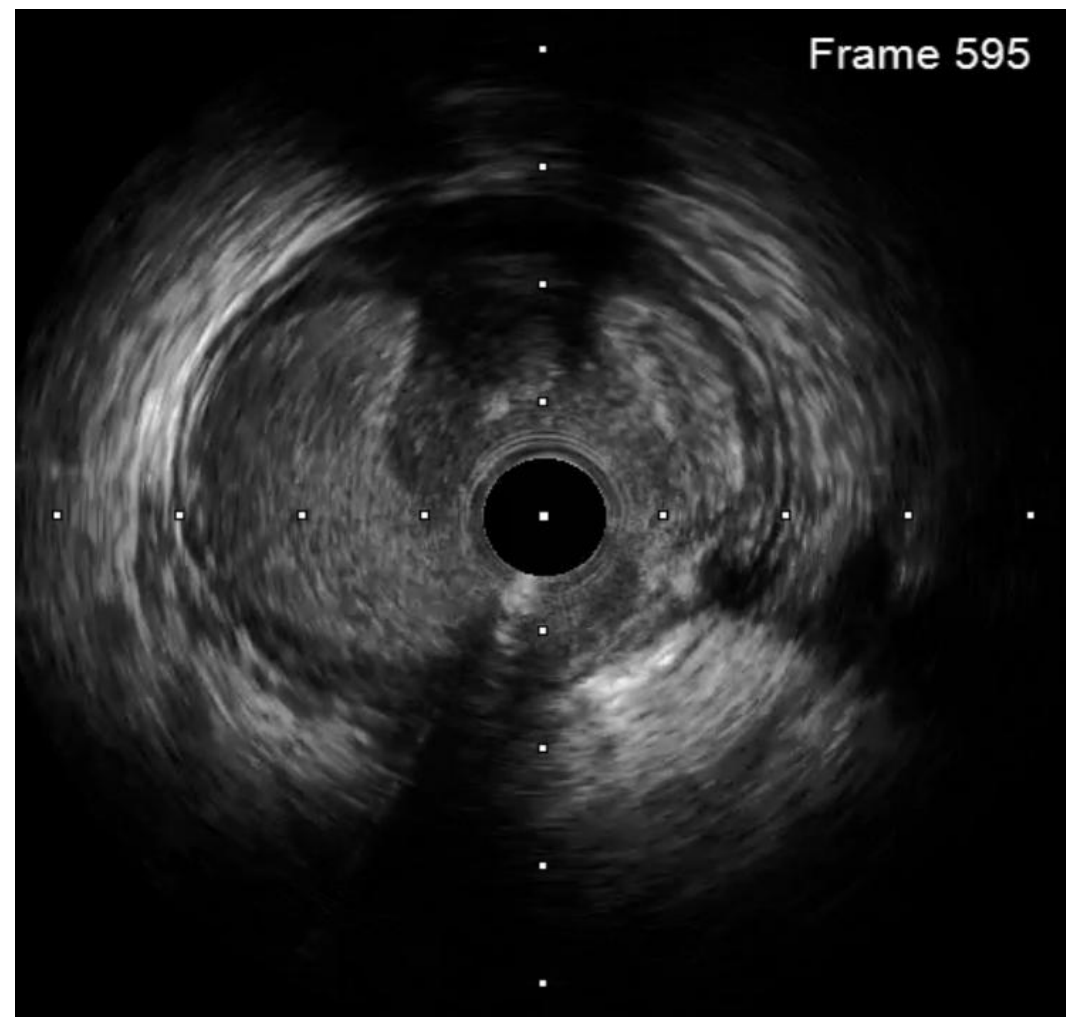
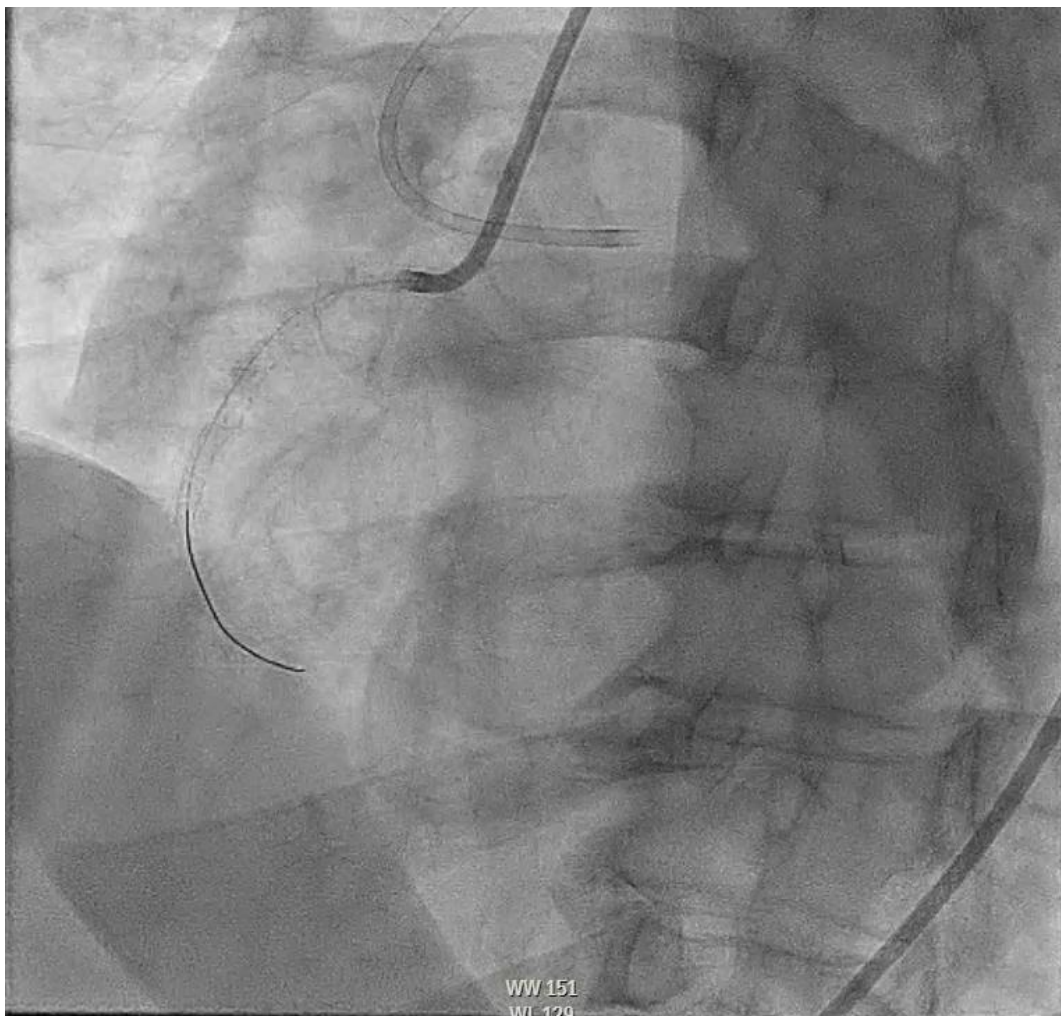
❖ Investment









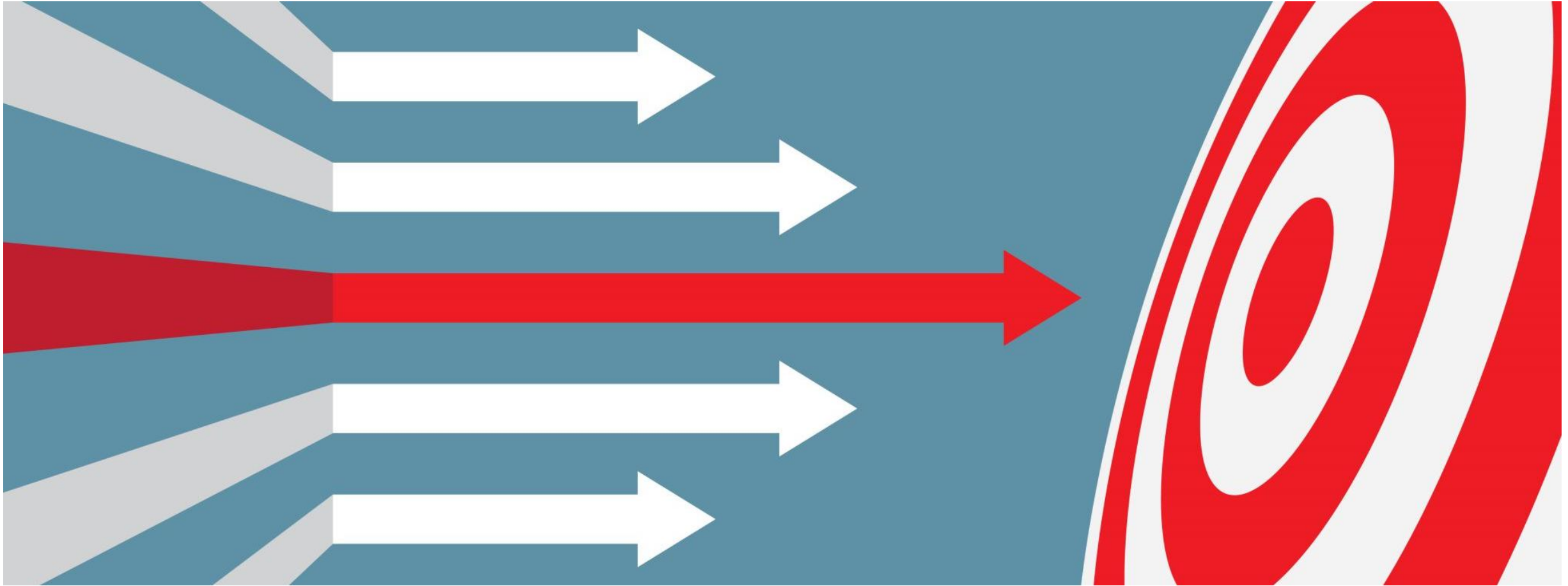




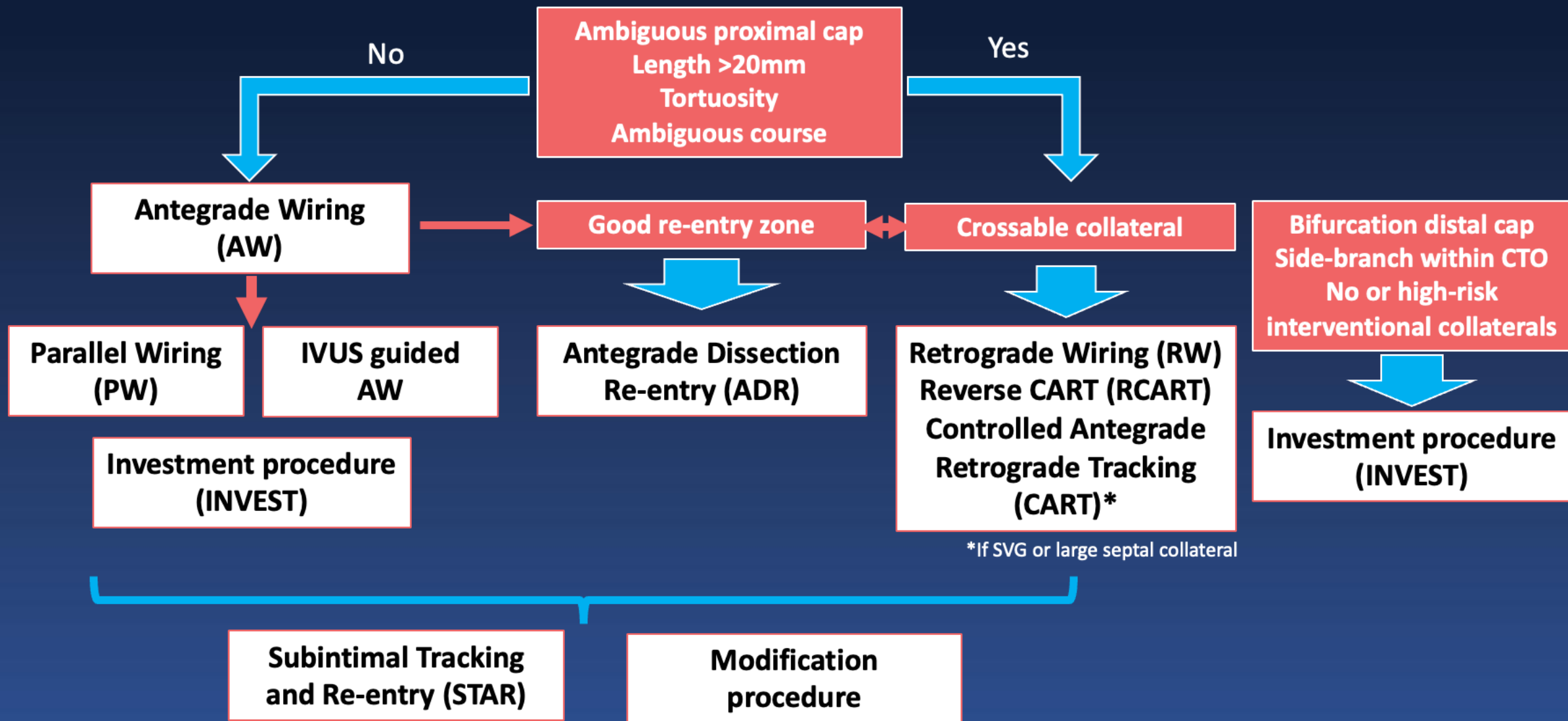
# The Goal

Minimize risk

Maximize success







\*If SVG or large septal collateral