



# **Epicardial collaterals: Wire and Microcatheter selection**

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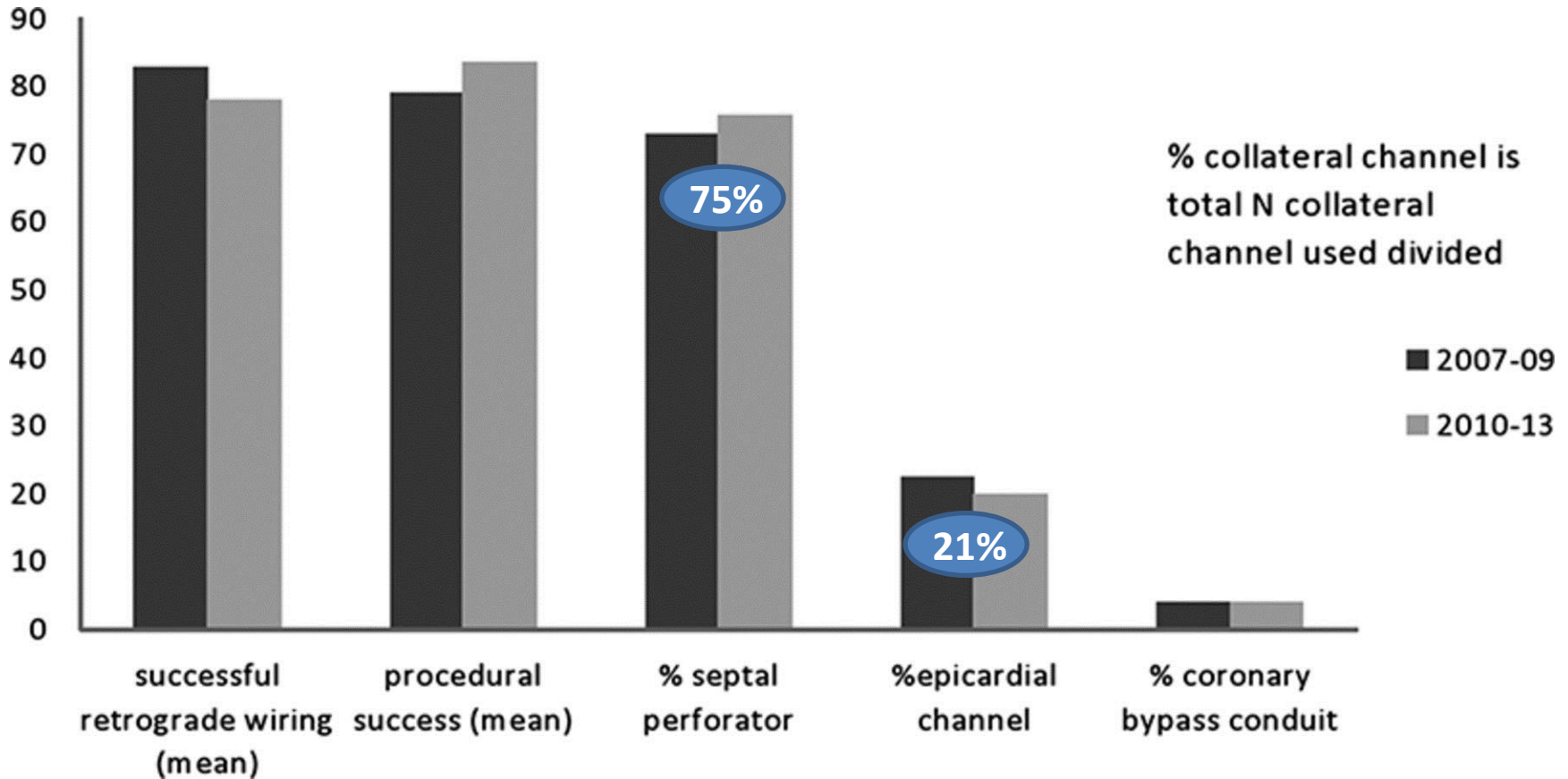


## Characteristics of specific channel – not all the same

	Corkscrew-like	Inextensible /stenosis	Length	Applicability	Distensibility
Epicardial	Significant ~Moderate	Potential~ Occasional	Long	Modest(>35%) ~Low(<10%)	Undilatable
Septal	Moderate~ mild	Rare	Short	High(>60%)	Dilatable

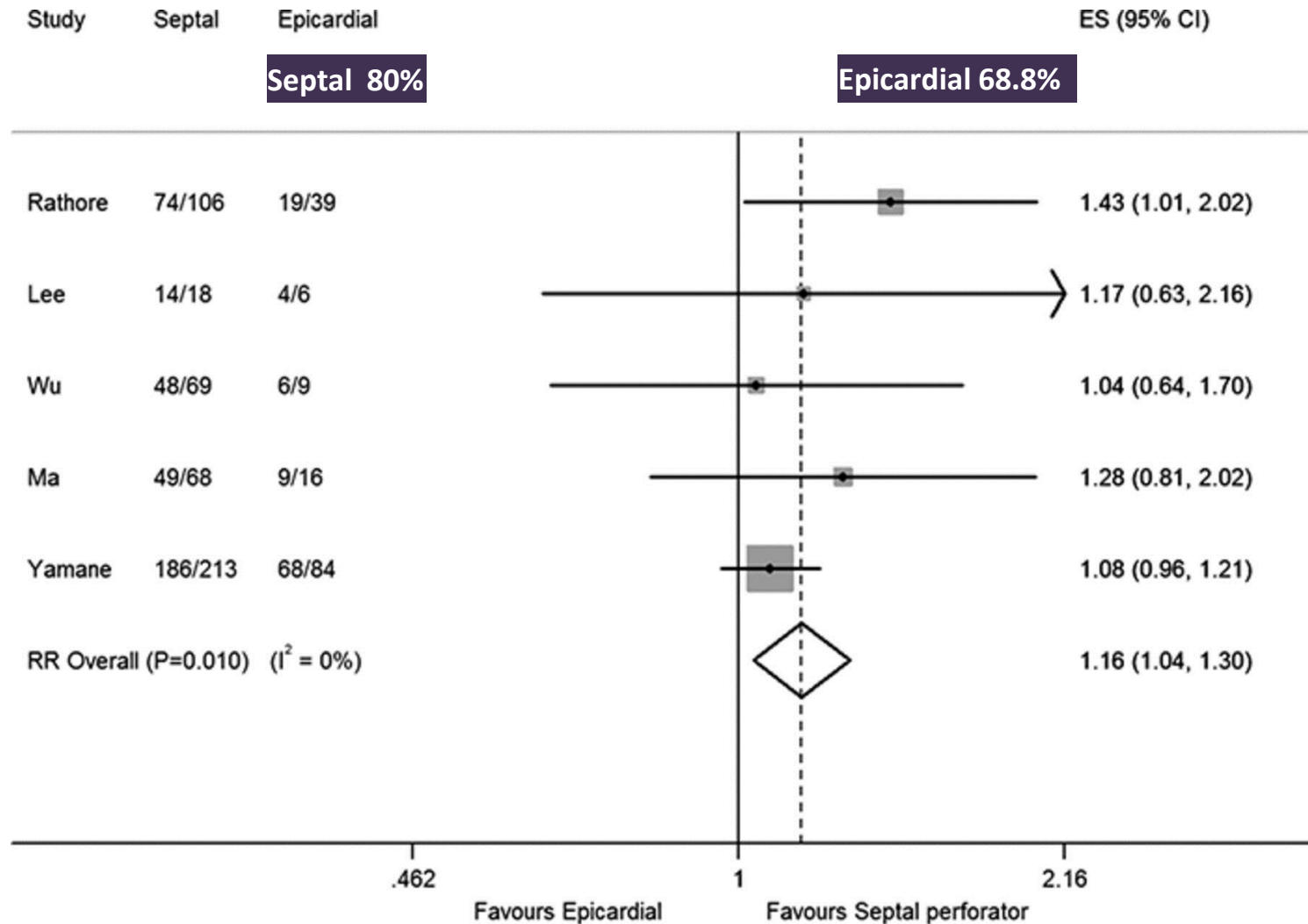
# Meta-analysis (~2013) on collateral feasibility

Temporal pattern in collateral channel use and overall success rate of CTO (1818 cases) revascularization



# Meta-analysis (~2013) on collateral feasibility

Greater success of retrograde wiring with septal channel



# Contemporary multicenter registry in US

2012~2016, 704 retro procedure

Figure 1A. Technical, procedural success and MACE among study procedures classified according to the used collateral type

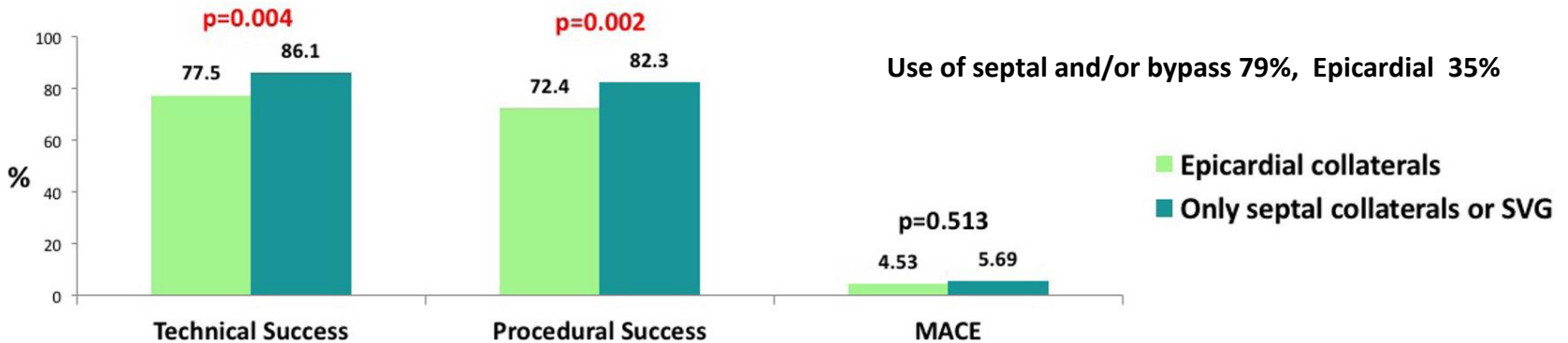
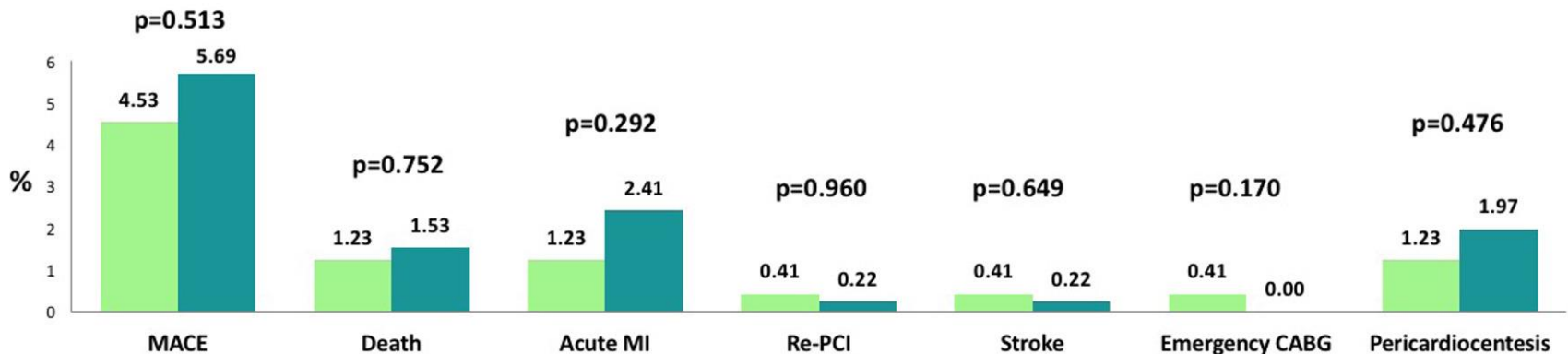


Figure 1B. Procedural complications among study patients classified according to the used collateral type



MACE: major cardiac adverse events; SVG: saphenous vein graft; MI: myocardial infarction; CABG: coronary bypass surgery

# Retrograde summit registry data



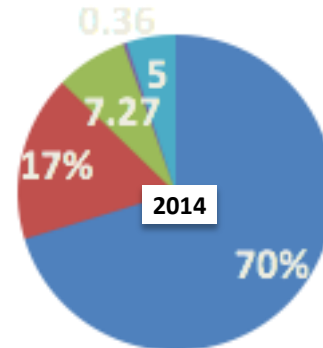
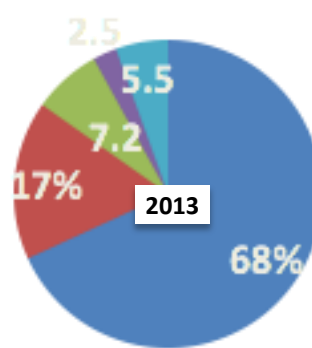
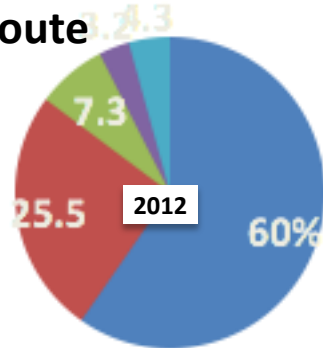
## GW for collateral crossing in 2012~2014

Channel cross success rate

	Total (1309)	2012 (490)	2013 (538)	2014 (281)	P
<b>Guidewire cross success</b>	<b>76.9% (1006)</b>	<b>77.5% (380)</b>	<b>76.4% (411)</b>	<b>76.5% (215)</b>	<b>0.8975</b>

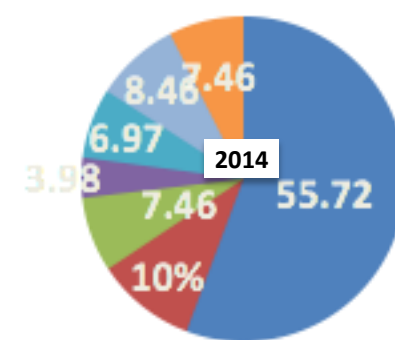
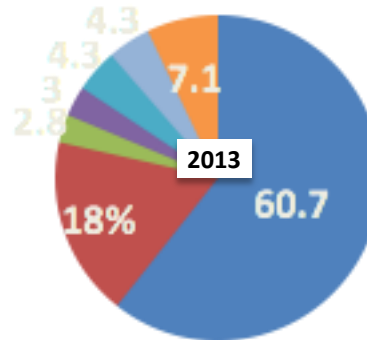
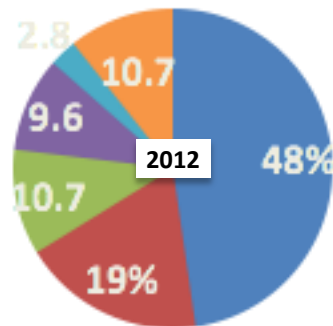
Successful collateral route

- Septal
- Epicardial
- AC
- Ipsilateral
- Bypass graft

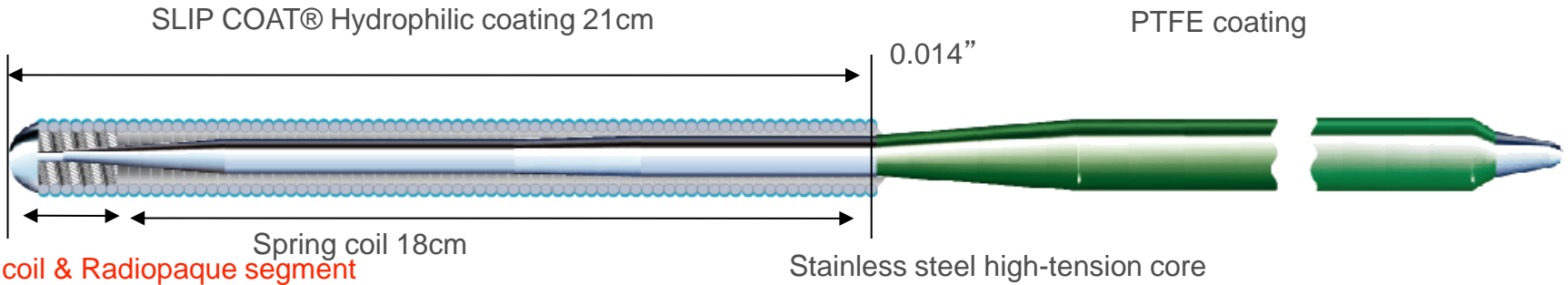


Successful guidewire

- SION
- XT-R
- SION blue
- Fielder FC
- SUOH
- SION black
- other

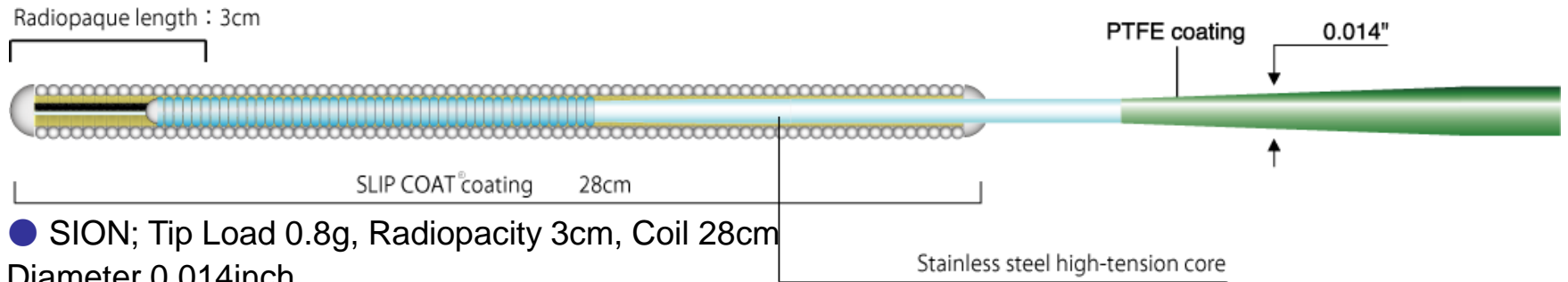


# Guide wires for collateral crossing

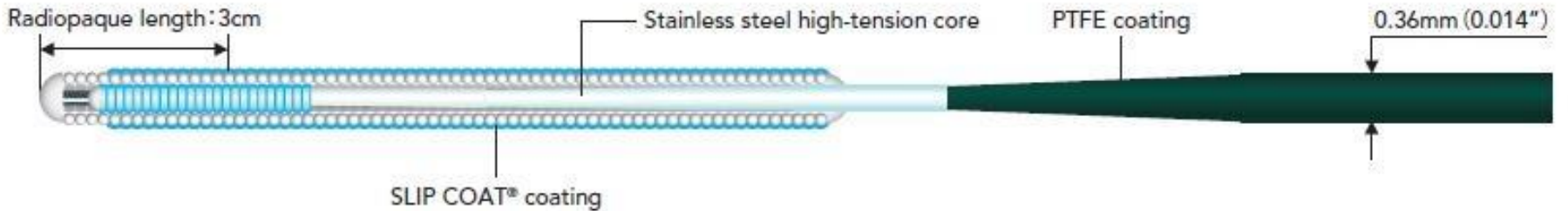


Rope coil & Radiopaque segment  
3cm

● SUOH; Tip Load 0.5g, Coil 21cm, Diameter 0.014inch

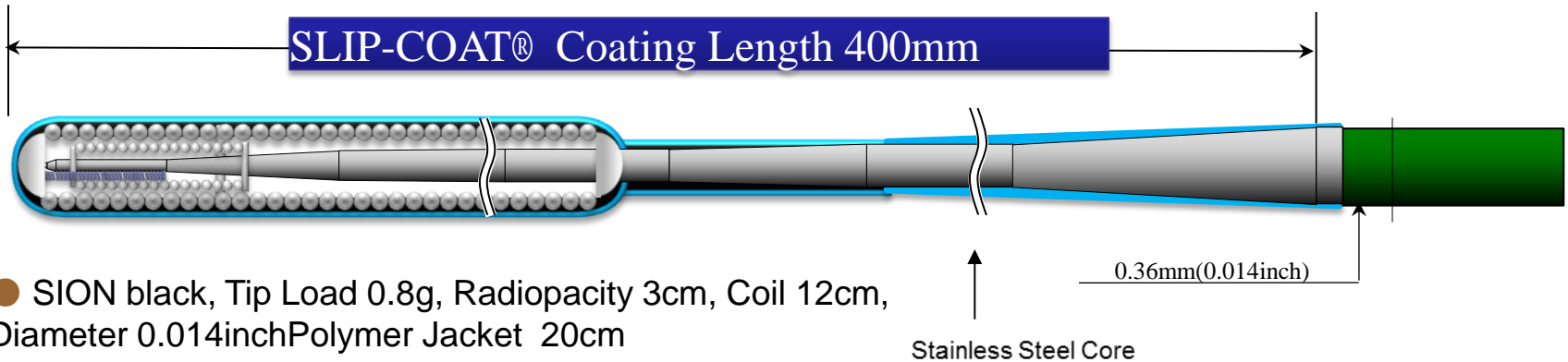


● SION; Tip Load 0.8g, Radiopacity 3cm, Coil 28cm  
Diameter 0.014inch

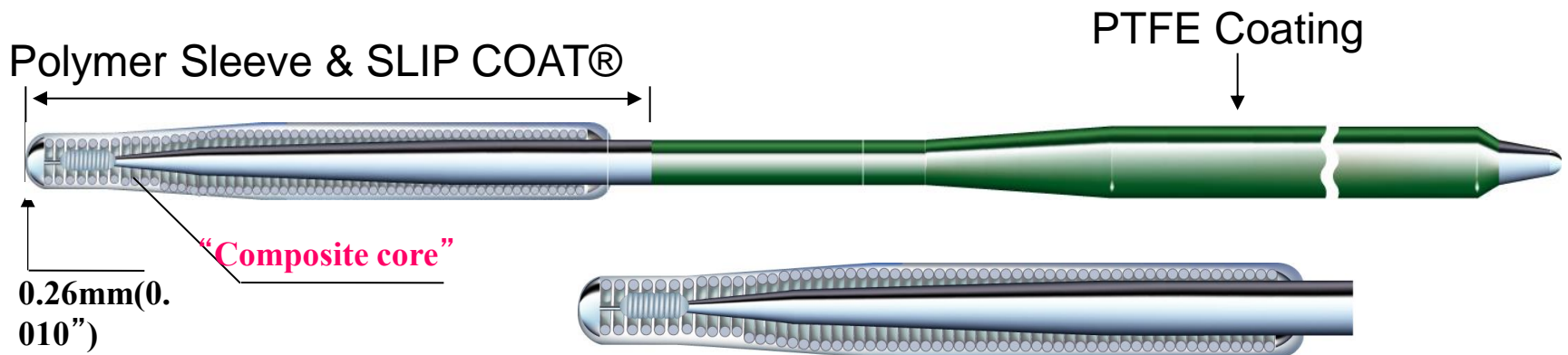


● SION blue; Tip Load 0.5g, Radiopacity 3cm, Coil 20cm  
Diameter 0.014inch

# Guide wires for collateral crossing



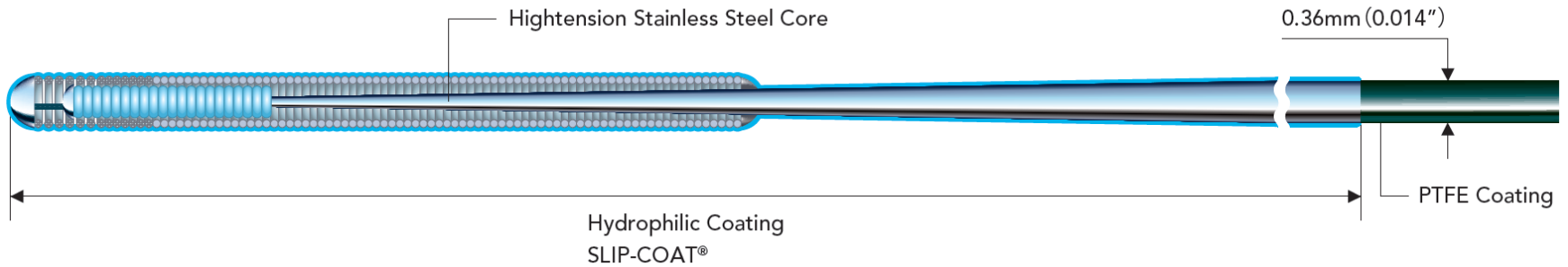
- SION black, Tip Load 0.8g, Radiopacity 3cm, Coil 12cm, Diameter 0.014inch Polymer Jacket 20cm Slip Coat 40cm



- Fielder XTR, Tip Load 0.6g, Radiopacity 16cm, Coil 16cm, Diameter 0.014inch, Tip diameter 0.010 inch Polymer Jacket



# SUOH 03

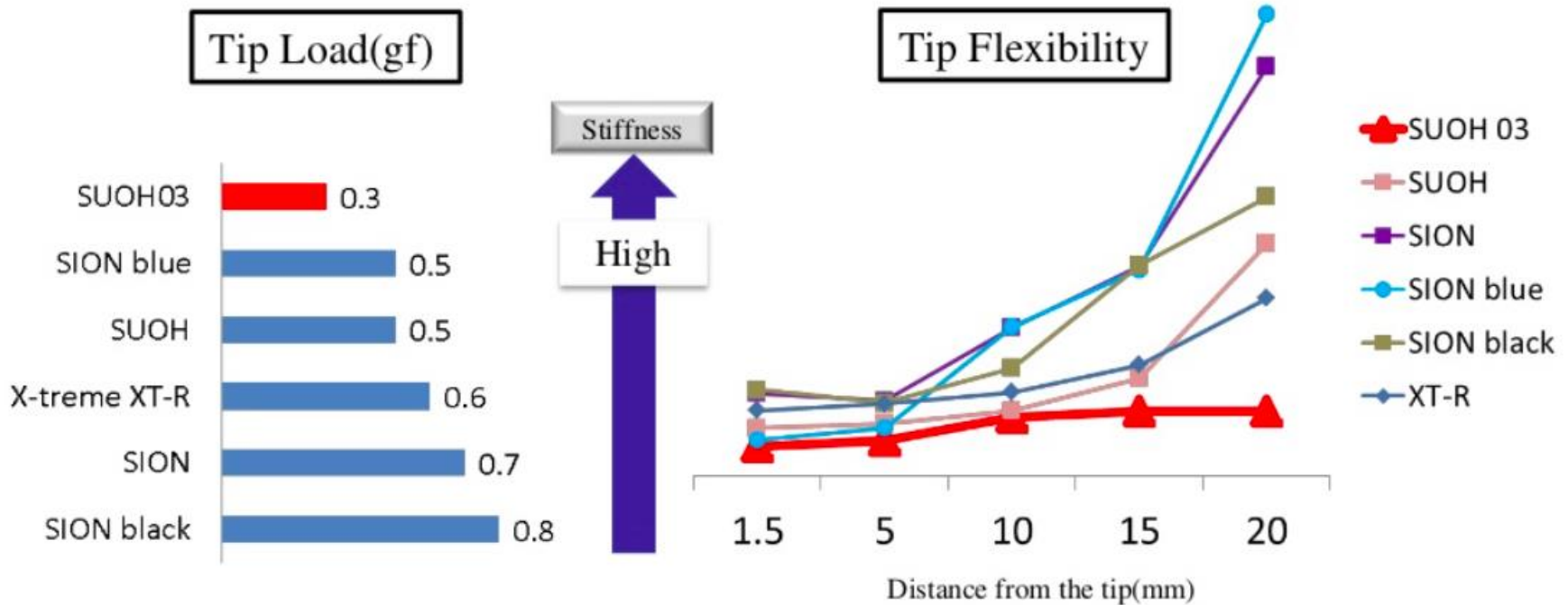


- Usable length : 190cm/300cm
- Hydrophilic coating length : 52cm
- Coil length : 19cm
- Radiopaque length : 3cm
- Tip Load : 0.3gf
- Tip Shape : Straight/ Pre-shape

# SUOH 03

SUOH03 is a **very flexible** wire, flexibility maintained from tip to its proximal part.

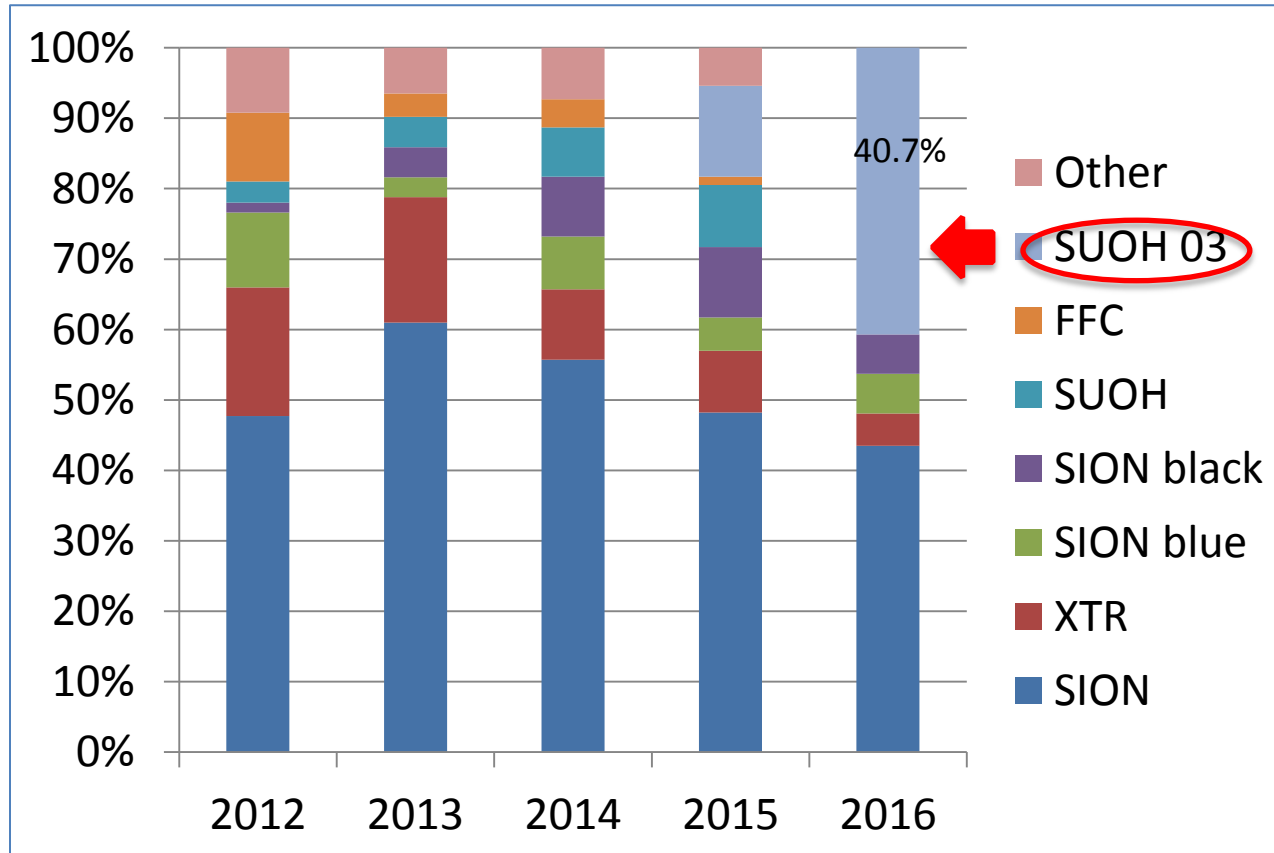
It facilitates to cross the small bended vessel by using its increased flexibility and track-ability.



# Retrograde summit registry data



## Annual change of GW for collateral crossing

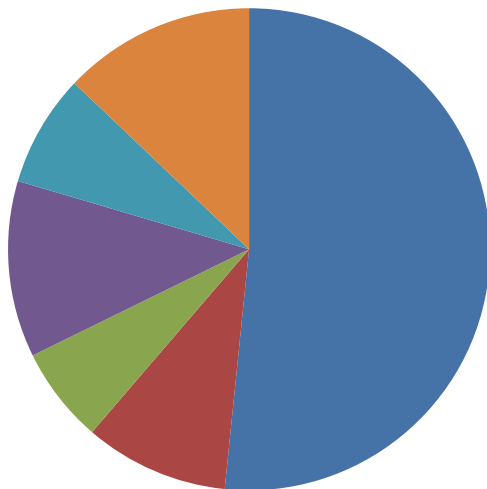


# Retrograde summit registry data



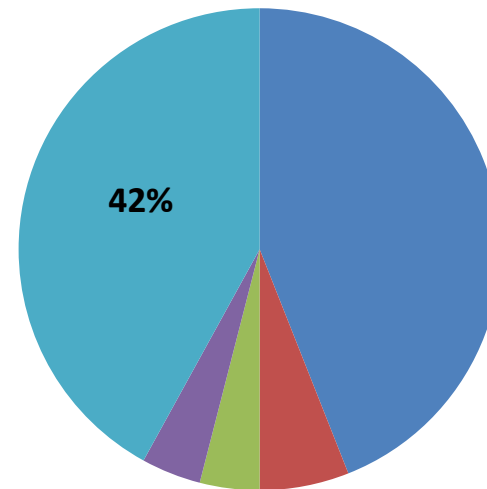
## Annual change of GW for septal channel

2015



- SION
- XTR
- SION blue
- SION black
- SUOH
- SUOH 03

2016



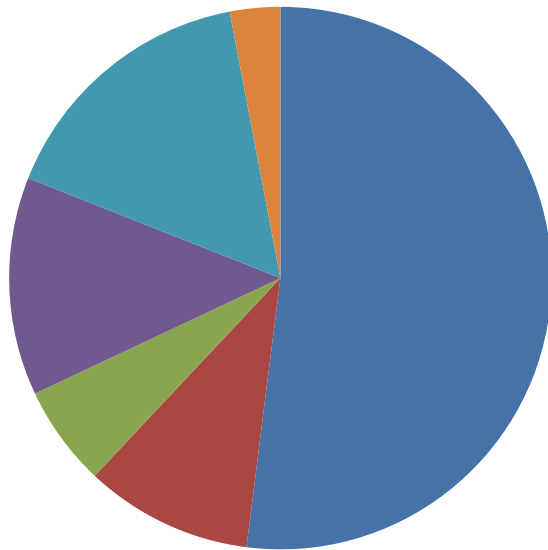
- SION
- XTR
- SION blue
- SION black
- SUOH 03

# Retrograde summit registry data



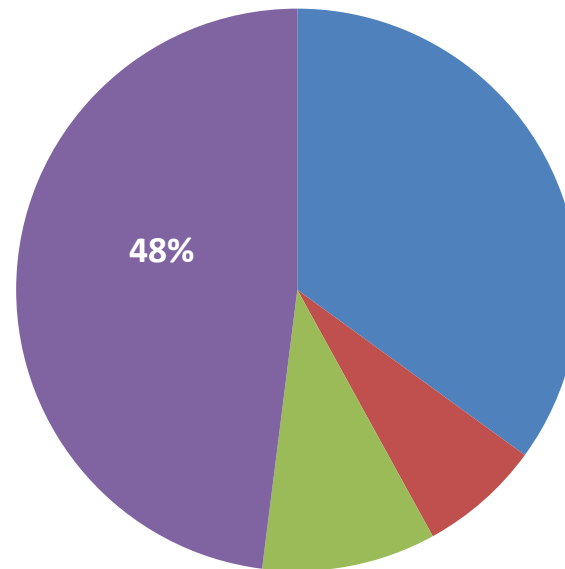
## Annual change of GW for septal channel

2015



- SION
- XTR
- SION blue
- SION black
- SUOH
- SUOH 03 other

2016

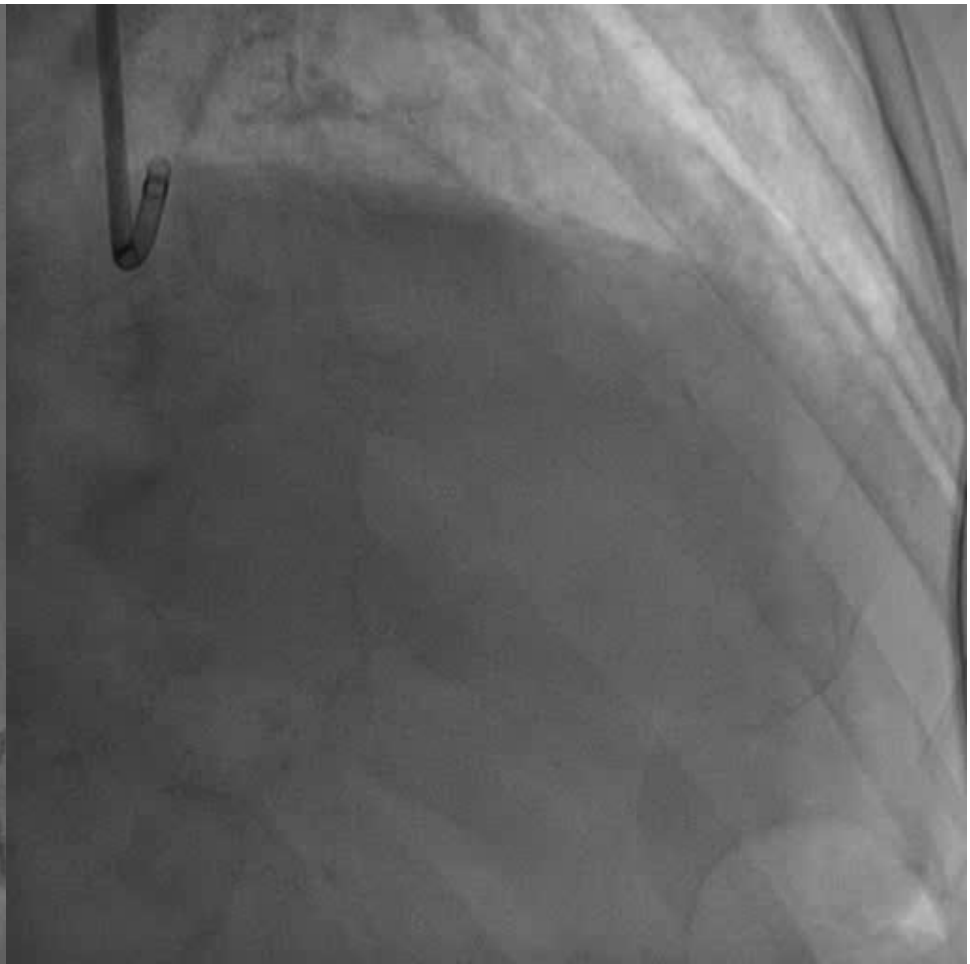


- SION
- SION blue
- SION black
- SUOH 03



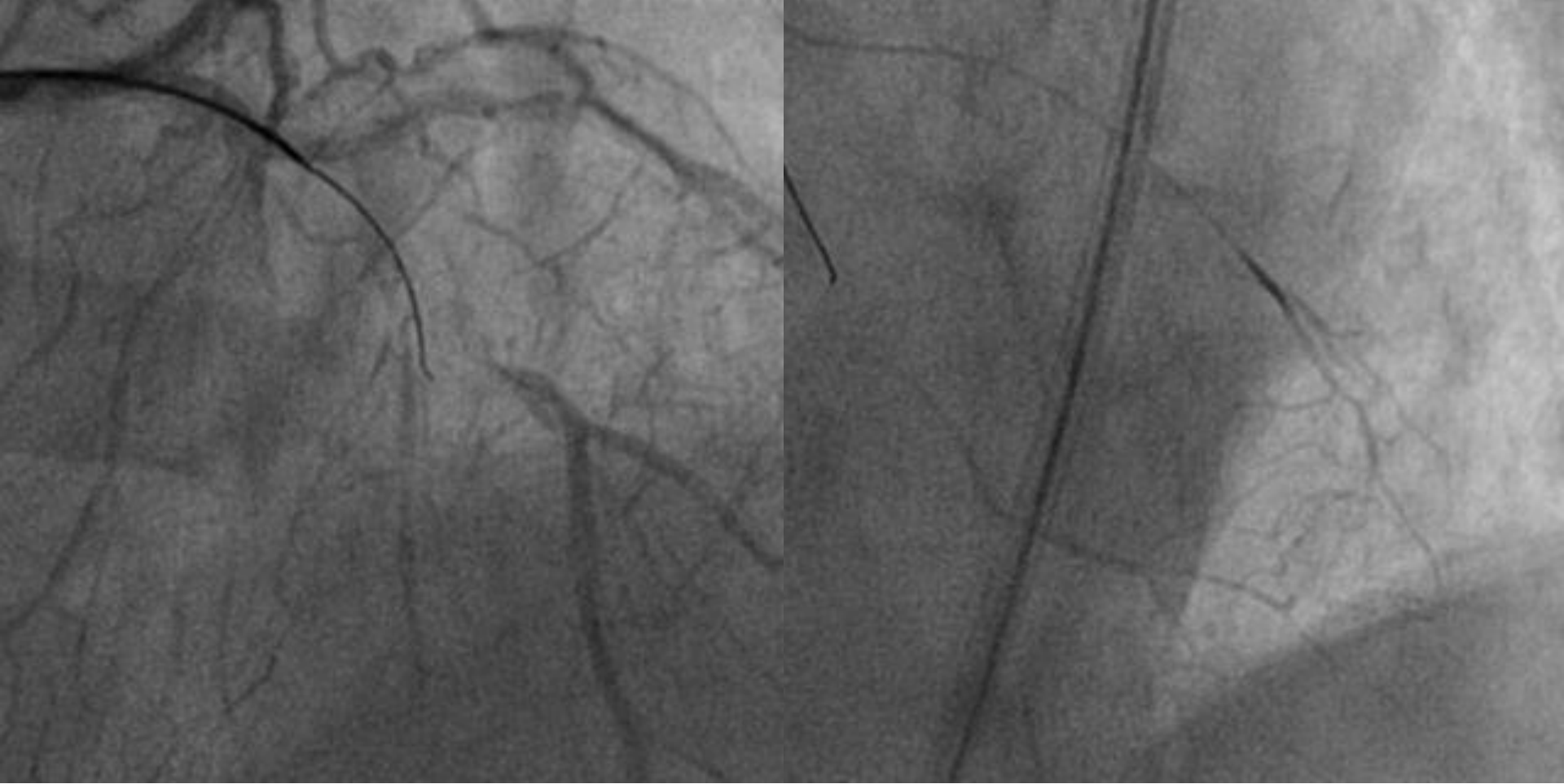
Complex Cardiovascular Therapeutics

# LAD CTO



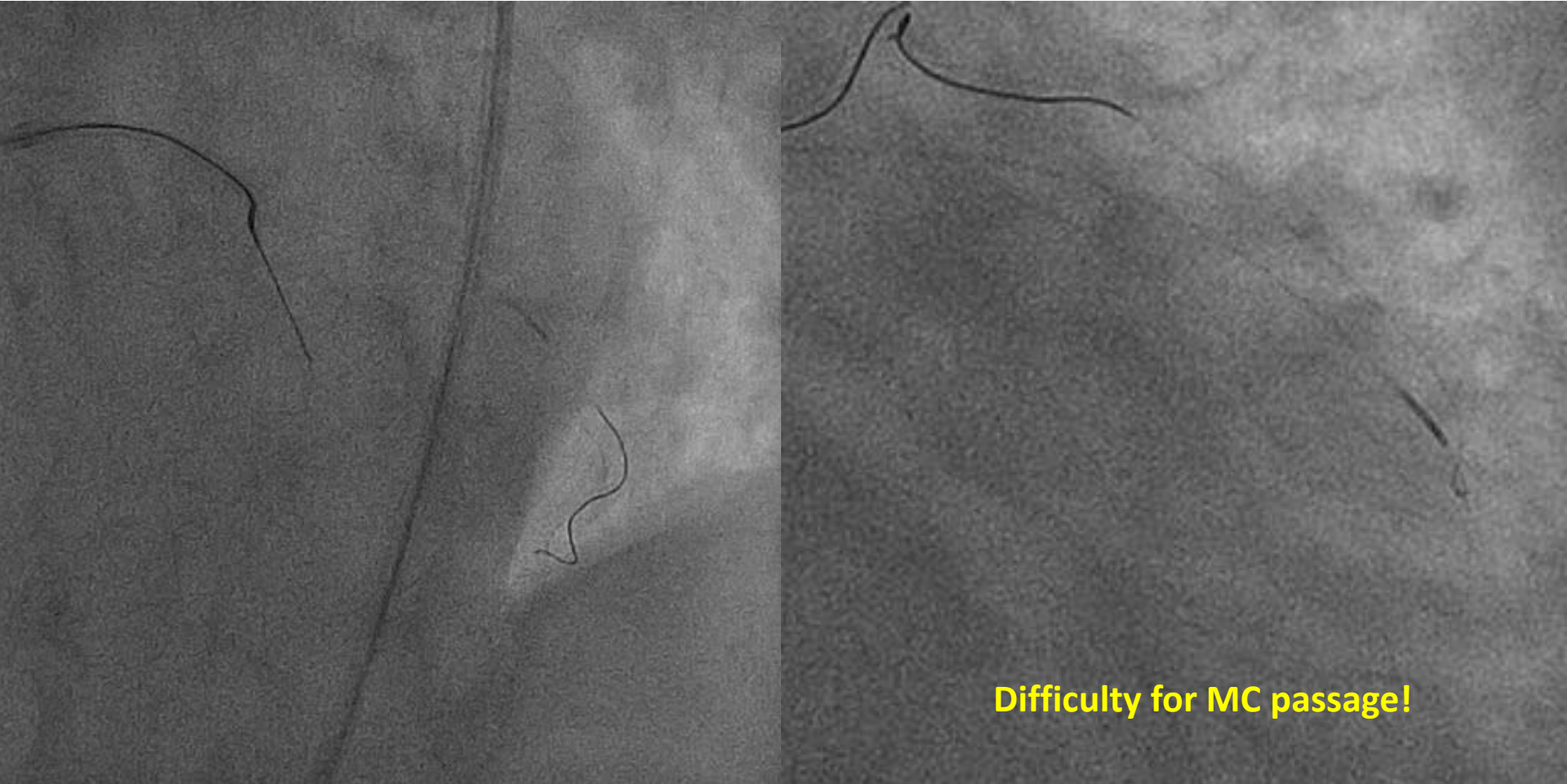


# Retrograde approach via epicardial artery





# SUOH 03 passed the channel

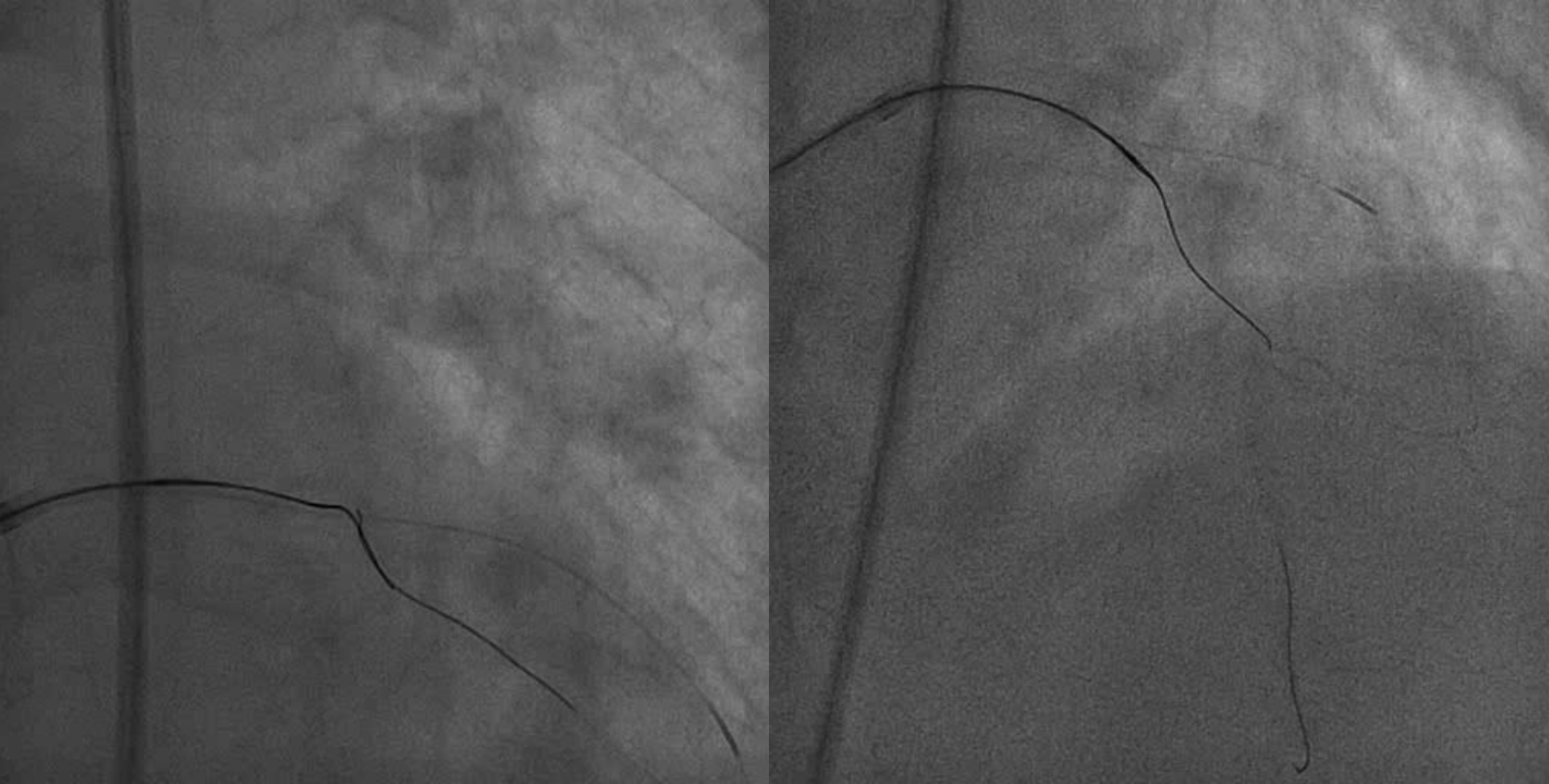


Difficulty for MC passage!



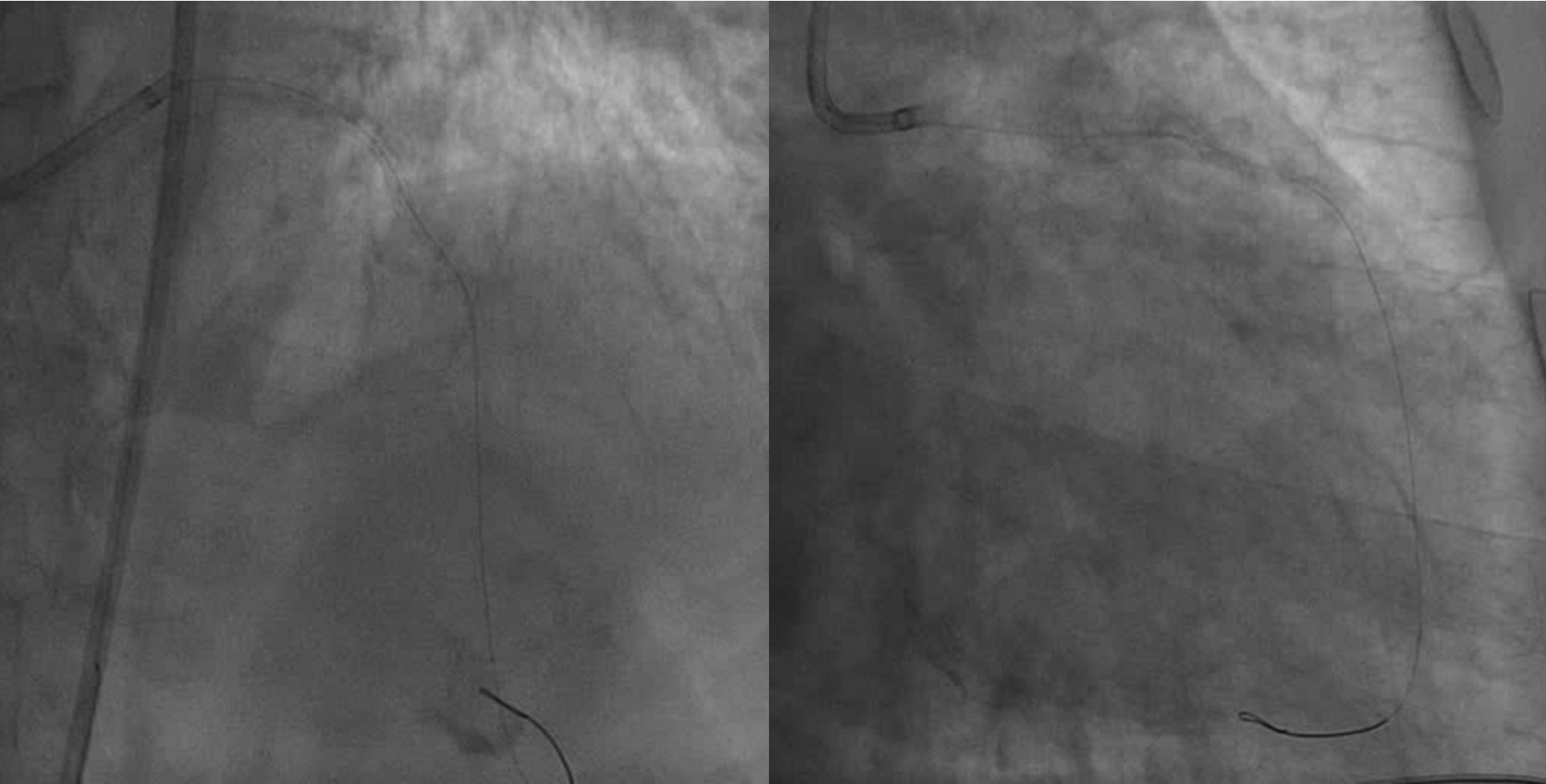


# GW passed to distal true lumen via KWT





# Final angiograms



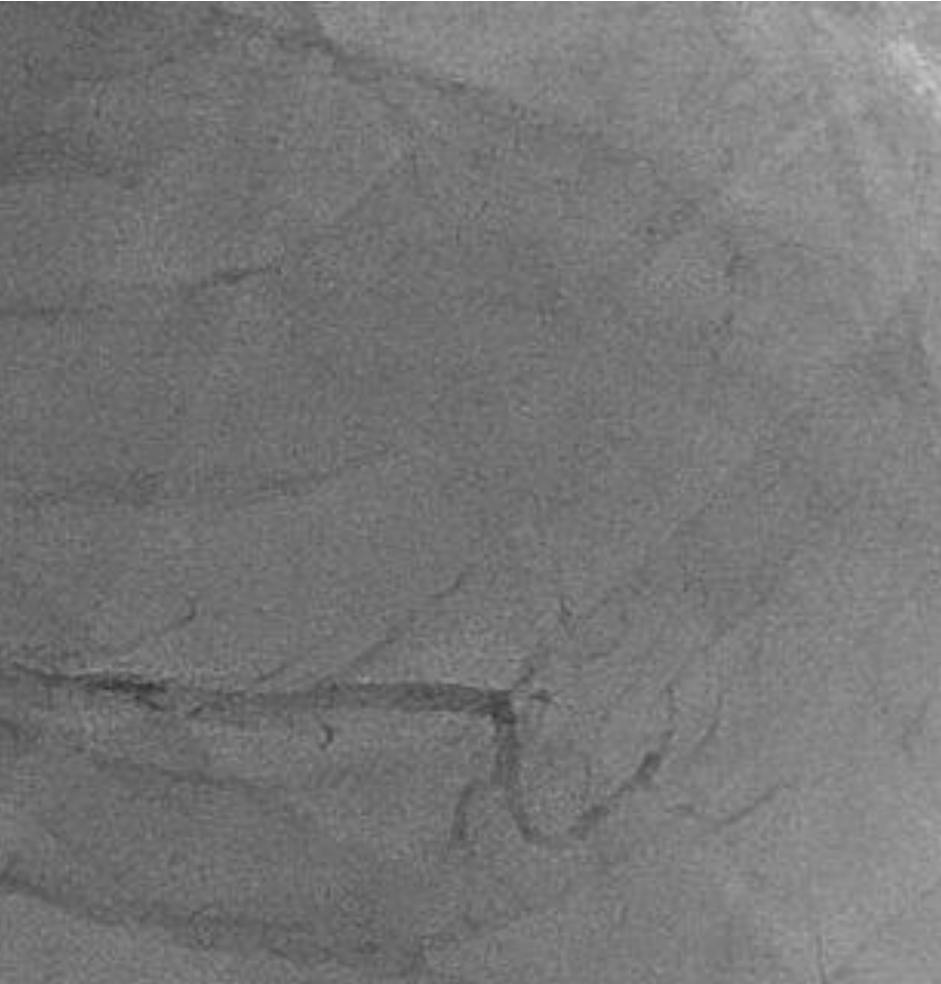


# LCX CTO: Failed antegrade procedure





# Retrograde via epicardial artery



Resistance at the GW tip!



# Channel determination and selection



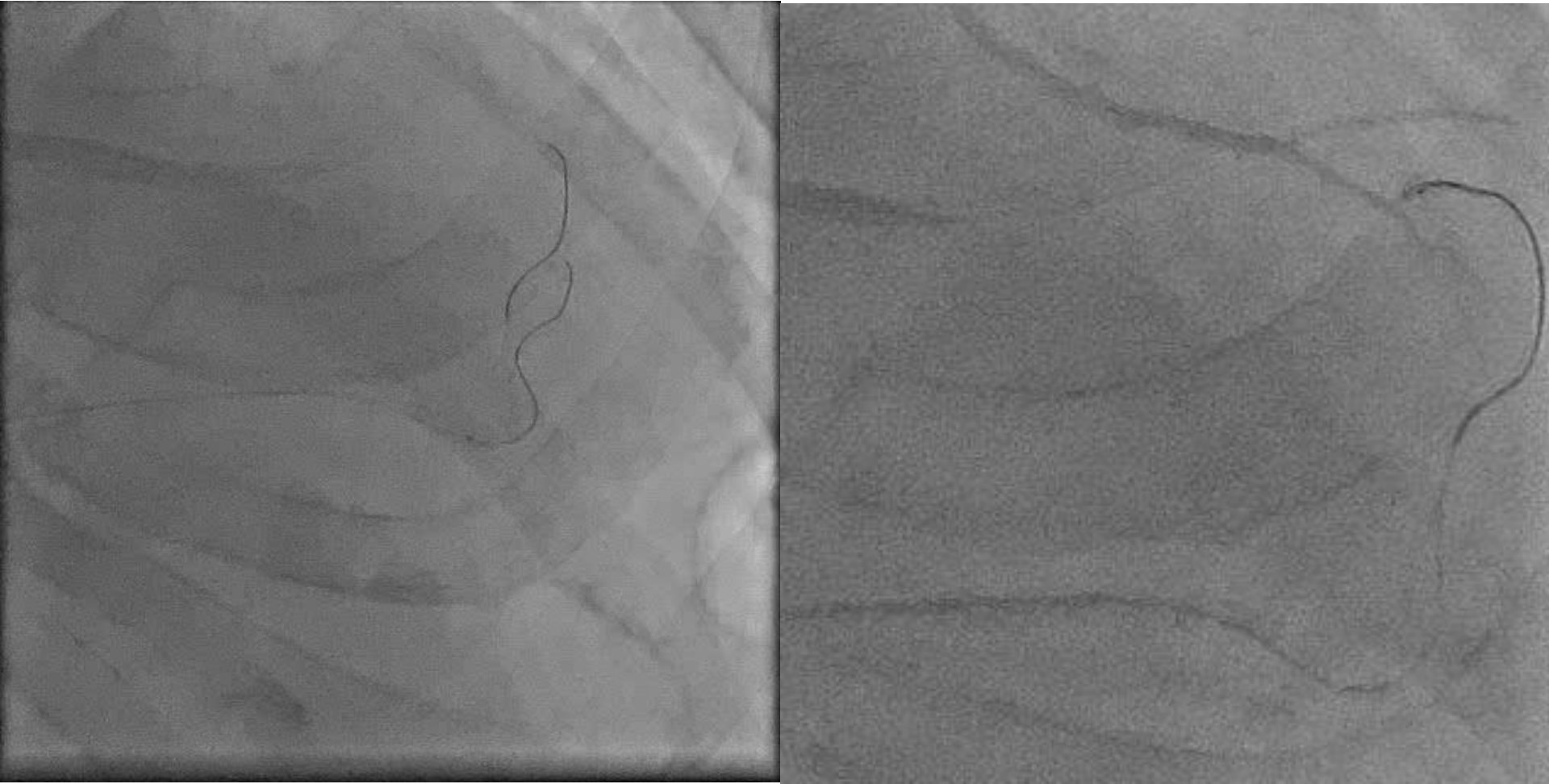
**Contrast injection via second MC**



**Contrast injection via twin lumen MC**

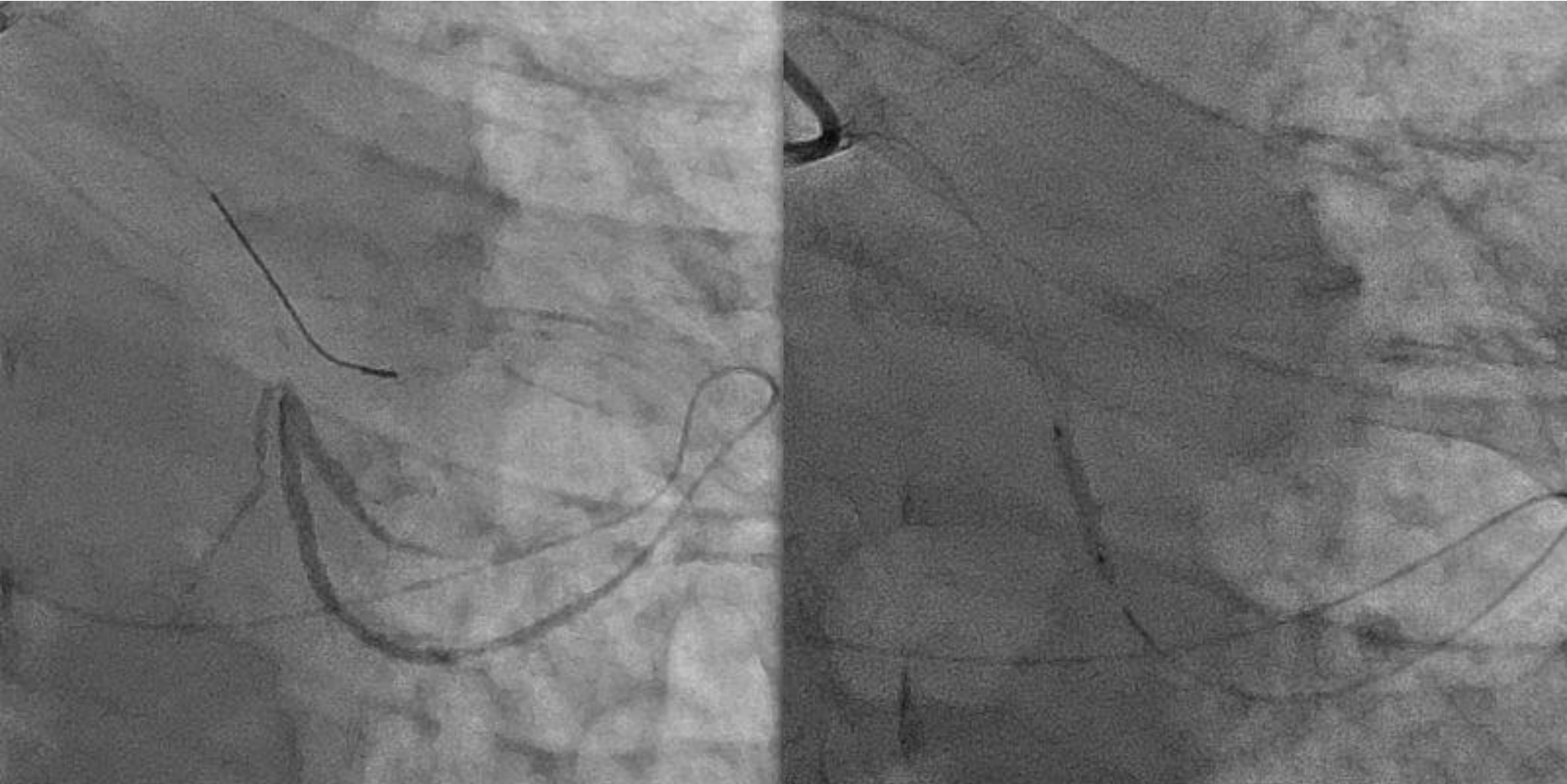


# SUOH 03 passed the channel



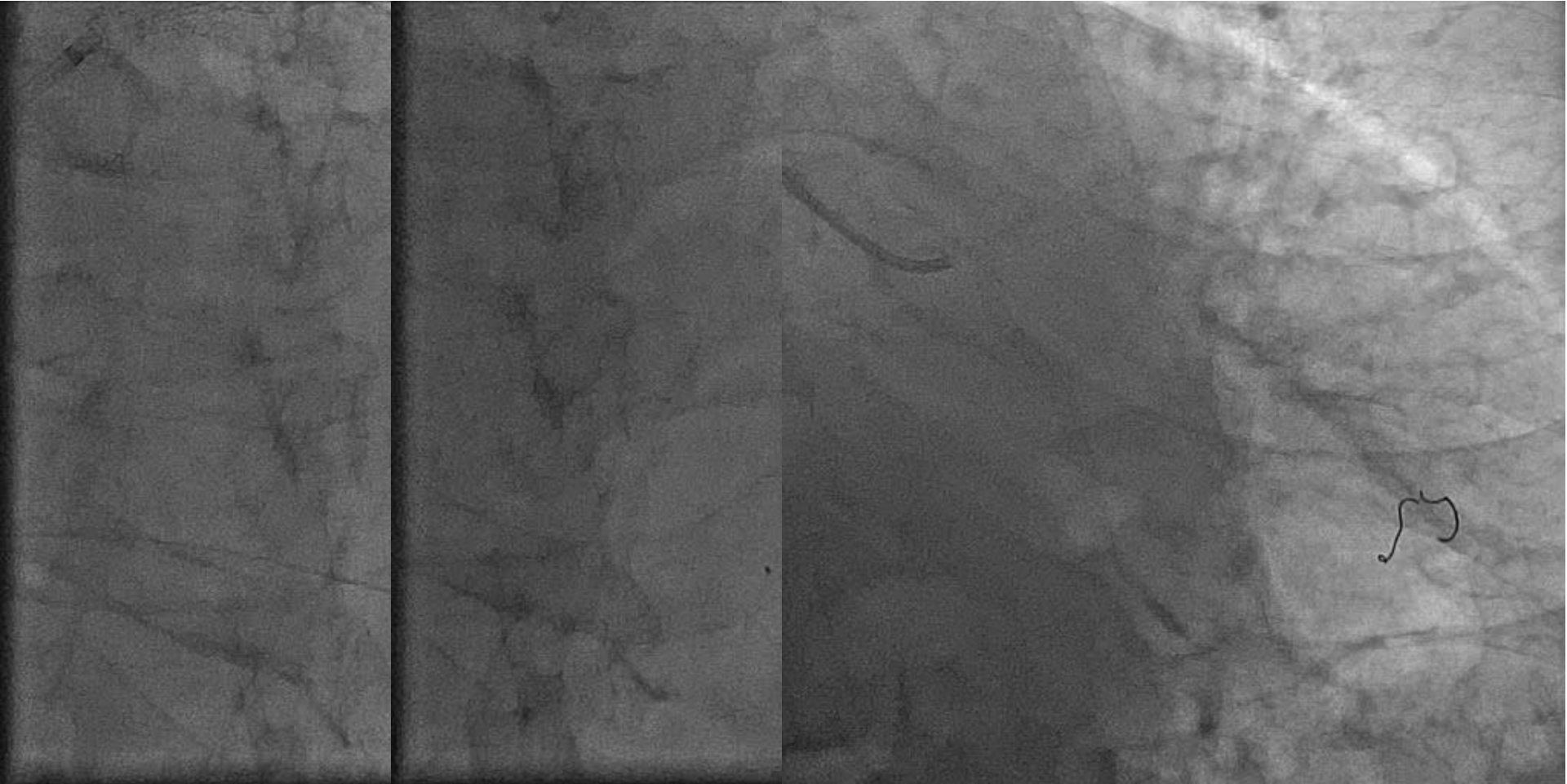


# MC passed the channel and reverse CART



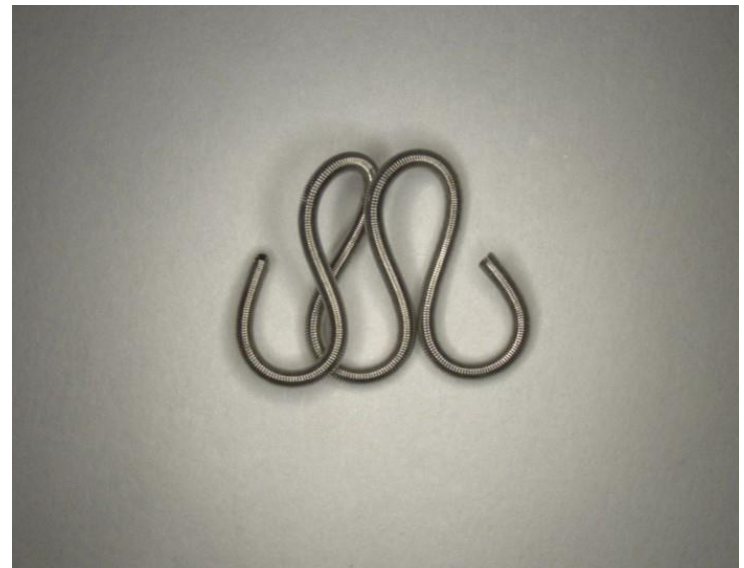
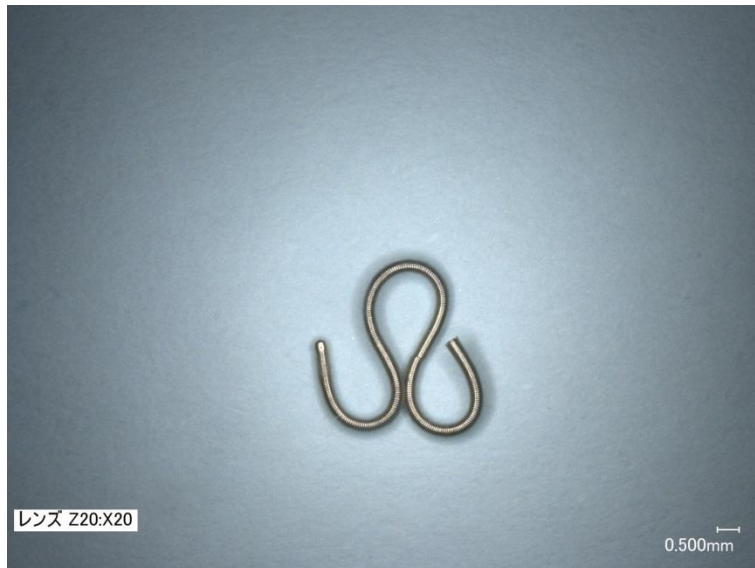
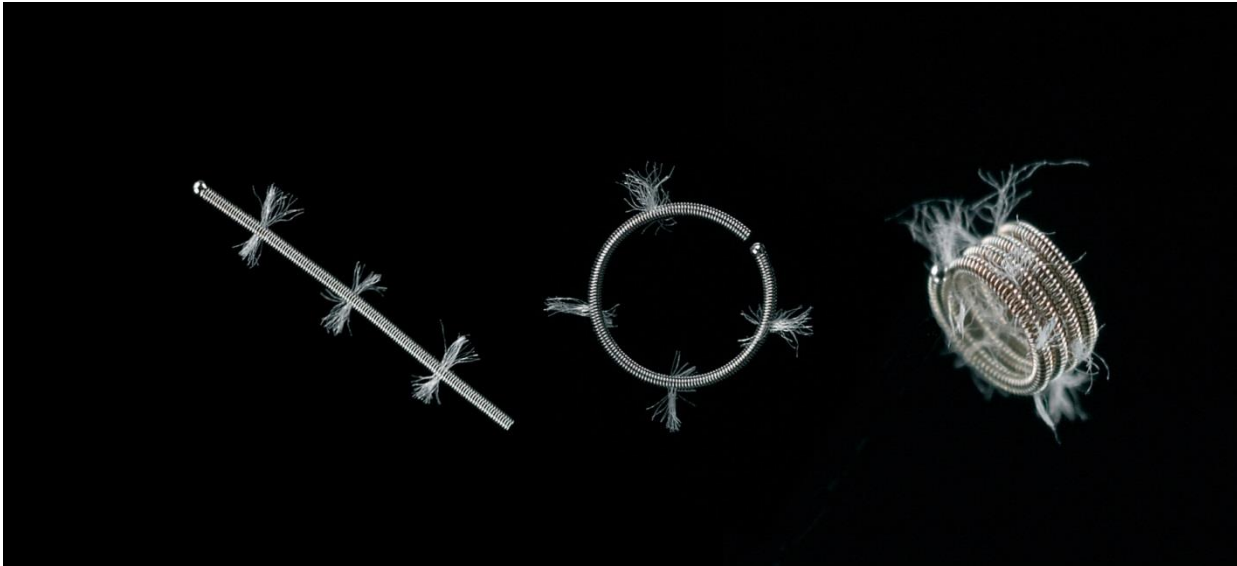


# Channel perforation (type 2) and coiling





# Embolic coils



# Retrograde channel crossing

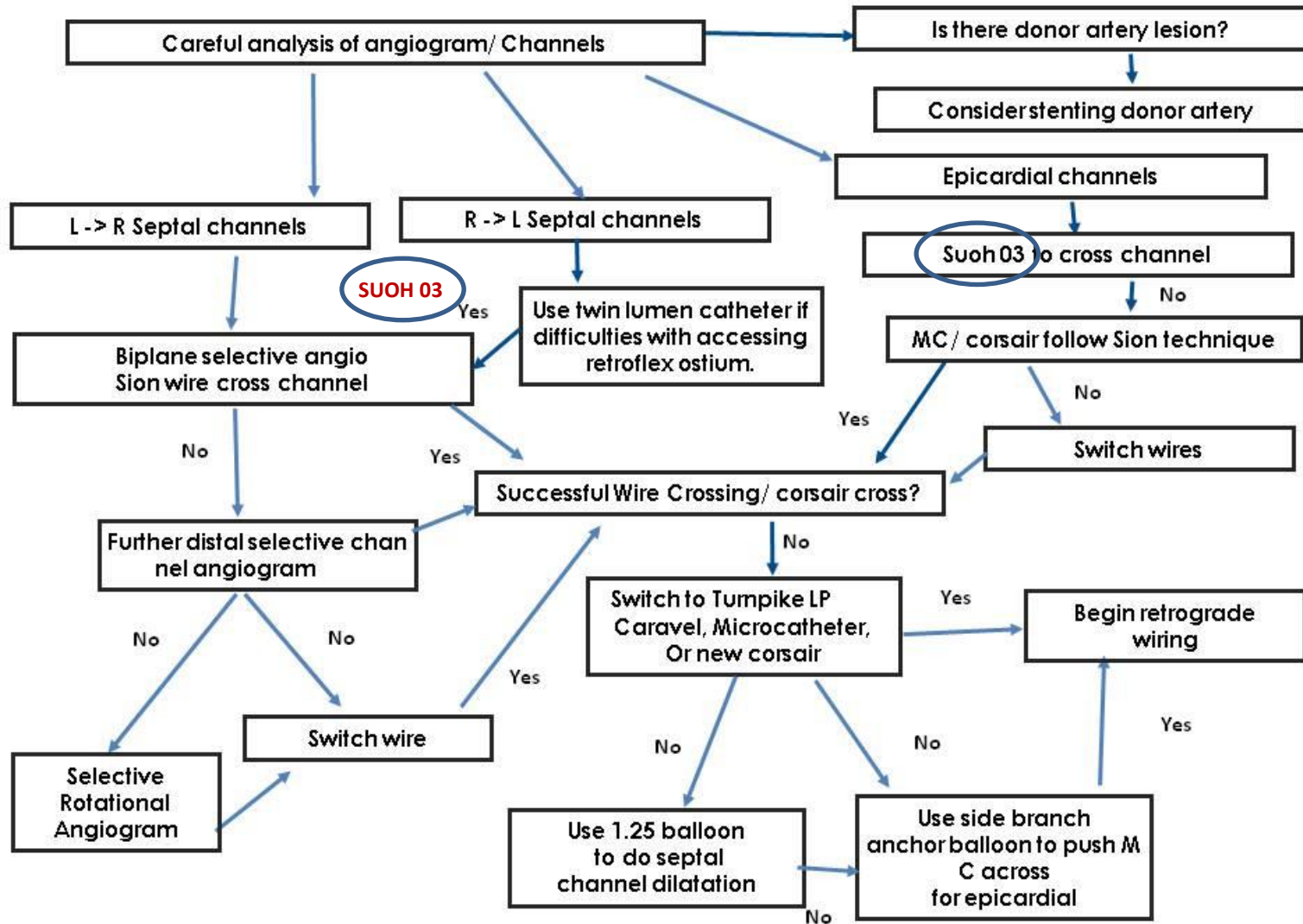
## GW selection for collateral channel

- When crossing epicardial channel, guide wire with tip flexibility is needed to avoid perforation. Therefore, now the frontline wire is **SUOH03**.
- When crossing septal channel, several anatomical factor should be considered for guide wire selection. The frontline wire was **SION** before. However, because of its improved maneuverability and flexibility, **SUOH03** became a frontline wire as SION.

Anatomy	Recommendable GW	
	Septal	Epicardial
Continuous tortuosity	<ol style="list-style-type: none"> <li>SION</li> <li>SUOH 03</li> <li>XT-R</li> </ol>	<ol style="list-style-type: none"> <li>SUOH 03</li> <li>SION</li> <li>XT-R(if a small vessel) SION black(if a large vessel)</li> </ol>
Small side branch At a bend of the artery	<ol style="list-style-type: none"> <li>SION</li> <li>SUOH 03</li> <li>XT-R(if a small vessel) SION black(if a large vessel)</li> </ol>	<ol style="list-style-type: none"> <li>SUOH 03</li> <li>SION</li> <li>XT-R(if a small vessel) SION black(if a large vessel)</li> </ol>
Acute bend	<ol style="list-style-type: none"> <li>SUOH 03</li> <li>SION</li> <li>SION black</li> </ol>	<ol style="list-style-type: none"> <li>SUOH 03</li> <li>SION</li> <li>SION black</li> </ol>
Crossing invisible channel	<ol style="list-style-type: none"> <li>XT-R</li> <li>SION black</li> <li>SION</li> </ol>	<b>Don't touch</b>

# Retrograde approach algorithm

For Simplifying the procedure and equipment





# Message

- After the advent of SUOH 03, selection of GW for collateral has been changed significantly.
- Use of epicardial collateral became increased and selected channel is getting more complex.
- Some studies show there is no significant difference of complication rates between septal and epicardial channel.
- However, cardiac tamponade tends to be higher in case of epicardial channel perforation.



# How to avoid complication

- Meticulous selection of channel and manipulation of GW are mandatory to avoid complications.
- It is important to stop GW advancement even there is a small resistance.
- Forceful advancement of MC easily leads to channel perforation, therefore, in case of difficulty of MC passage, KWT is one method to recanalize CTO.
- Coil embolization might be agreeable even in Ellis type II perforation of the epicardial channel (not a consensus).