

Recanalization of CTO secondary to in-stent restenosis(ISR) by CrossBoss

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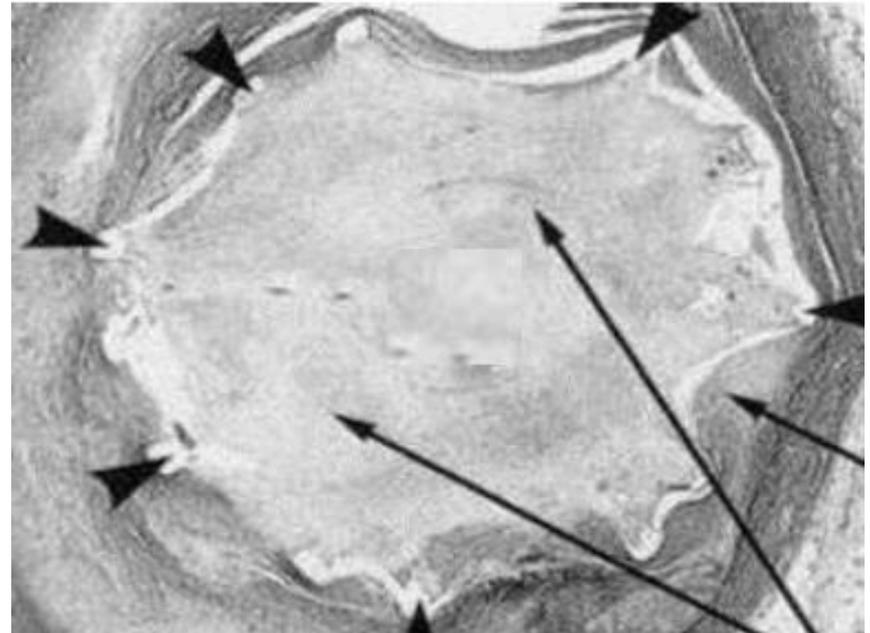
Background

- Occlusive ISR is an uncommon cause of CTOs (<5%)
- Most are symptomatic (stable angina)
- Presence of stent(s) within CTO
 - “Roadmap” (lack of anatomic ambiguity)
 - Protection against perforation

BUT Case reports

Suggest lower success rates

- Hyperplastic smooth muscle and hypocellular matrix of ISR is hard and resistant with lack of microchannels (need penetrative wires)



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Background

- Mode of failure
 - Inability to cross with wire
 - Inability to stay within struts (esp stiff wires)
- Reported predictors of failure
 - Longer duration occlusion
 - Smaller initial stent diameter
 - Large side branch at proximal cap
- CTO ISR usually excluded from CTO trials
- Previous devices trialled
 - Optical reflectometry wire, Frontrunner™ device

Furuichi S, Airoidi F, Colombo A. Intravascular ultrasound- guided wiring for chronic total occlusion. *Catheter Cardiovasc Interv* 2007;70:856–859.

Yang Y-M, Mehran R, Dangas G, Reyes A, Qin J, Stone GW, Leon MB and Moses JW. Successful use of the Frontrunner Catheter in the treatment of in-stent coronary chronic total occlusions. *Catheter Cardiovasc Int* 2004;63:158–161.

Hoye A, Onderwater E, Cummins P, Sianos G, Serruys PW. Improved recanalization of chronic total coronary occlusions using an optical coherence reflectometry-guided guidewire. *Catheter Cardiovasc Interv* 2004;63:158–161.



The CrossBoss™ CTO Crossing Catheter

The CrossBoss™ catheter is an OTW stainless steel catheter designed to quickly and safely pass through the CTO to gain access to the distal true lumen or enter subintimal pathways. The catheter is advanced by using rapid bi-directional rotation.



- Utility in CTOs established in FAST-CTOs trial (ISR excluded)*
- Early clinical experience suggests well suited to this setting**
 - Subintimal passage prevented by stents
 - Narrow diameter affords passage to distal vessel
 - OTW design allows easy passage of wire to distal lumen



*FAST-CTOs trial. Am Coll Cardiol Interv, 2012; 5:393-401

**Papayannis A, Banerjee S, Brilakis E. Use of the CrossBoss catheter in Coronary chronic total occlusion due to in-stent restenosis. Catheter Cardiovasc Interv



Clinical case

- 74 years old male
- Effort angina and breathlessness 2 months
- PCI history: Anterior MI 9 years ago---LAD stent;
Unstable angina 7 years ago---RCA two stents

(At that time, left coronary angiogram showed total occlusion in proximal LAD stent, but failed to open it)

➤ Cardiac risk factors

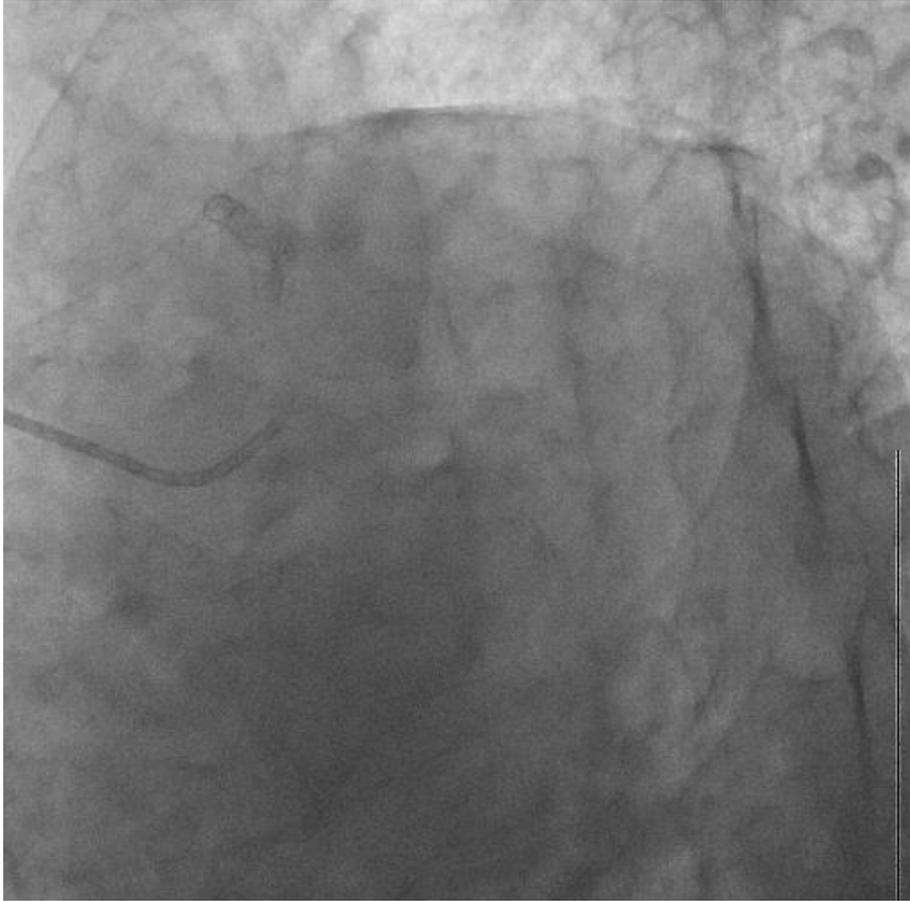
- Hypertension
- Smoking
- HLP

➤ Investigations

- EF%: 39%
- LVA at apex of heart



Coronary angiogram



Total occlusion of proximal LAD stent



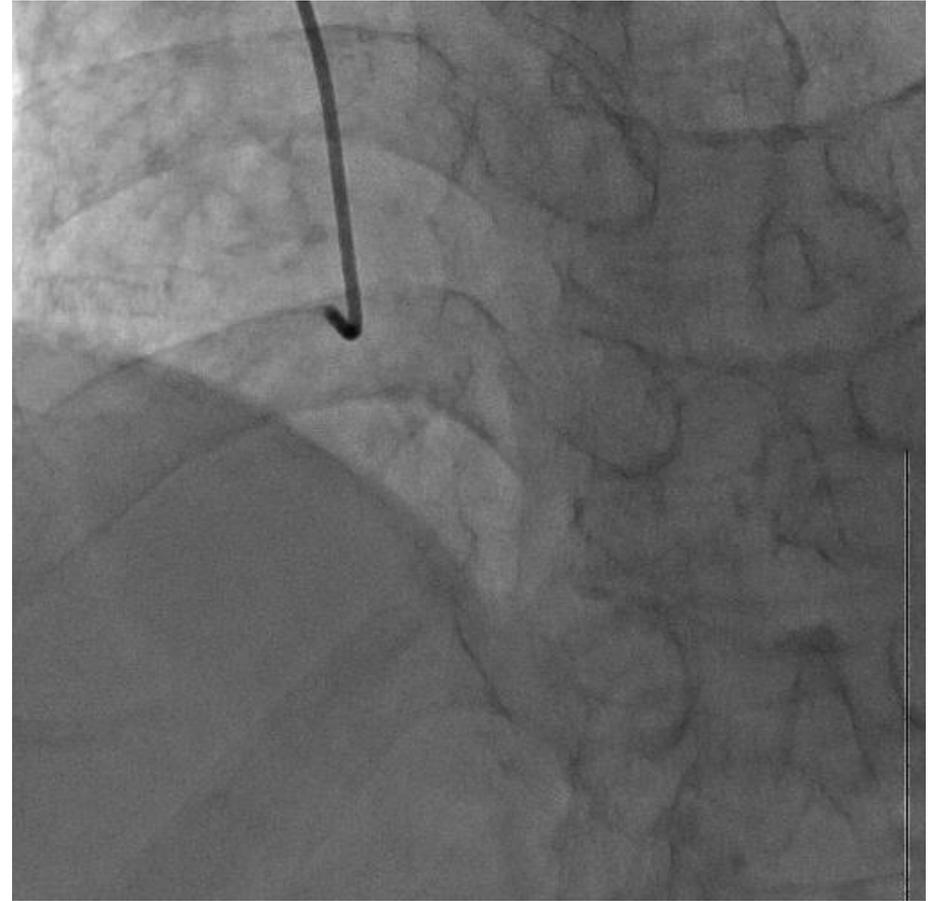
Crinial view



Coronary angiogram



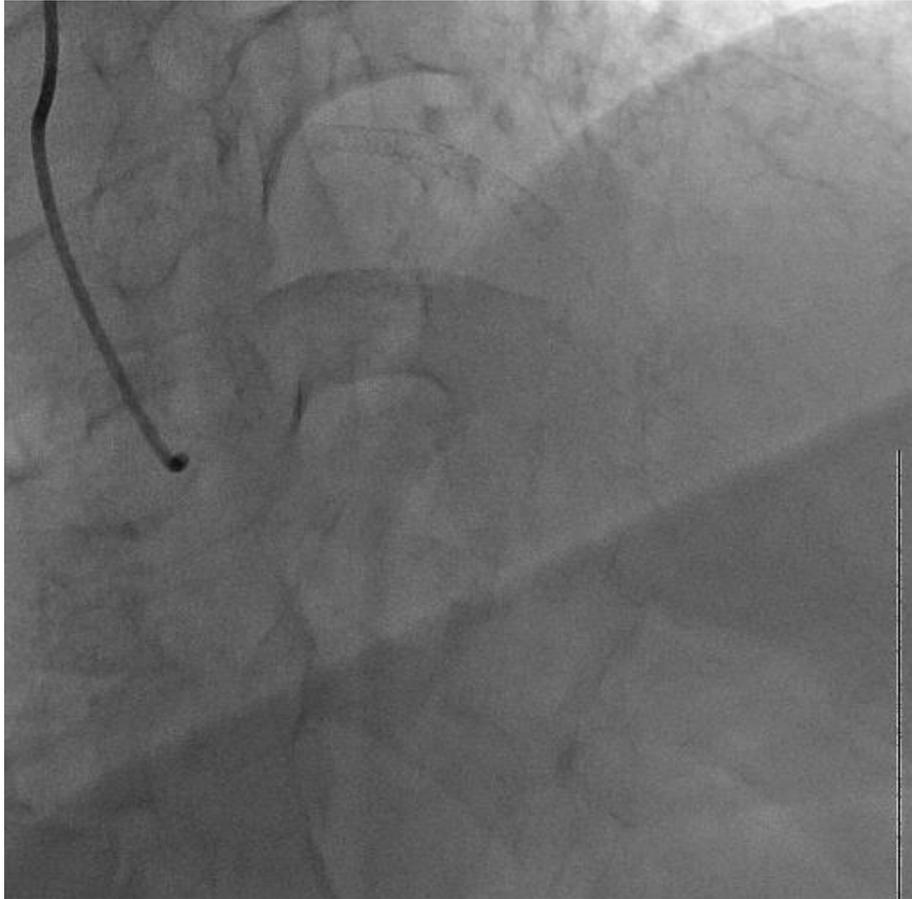
Caudal view



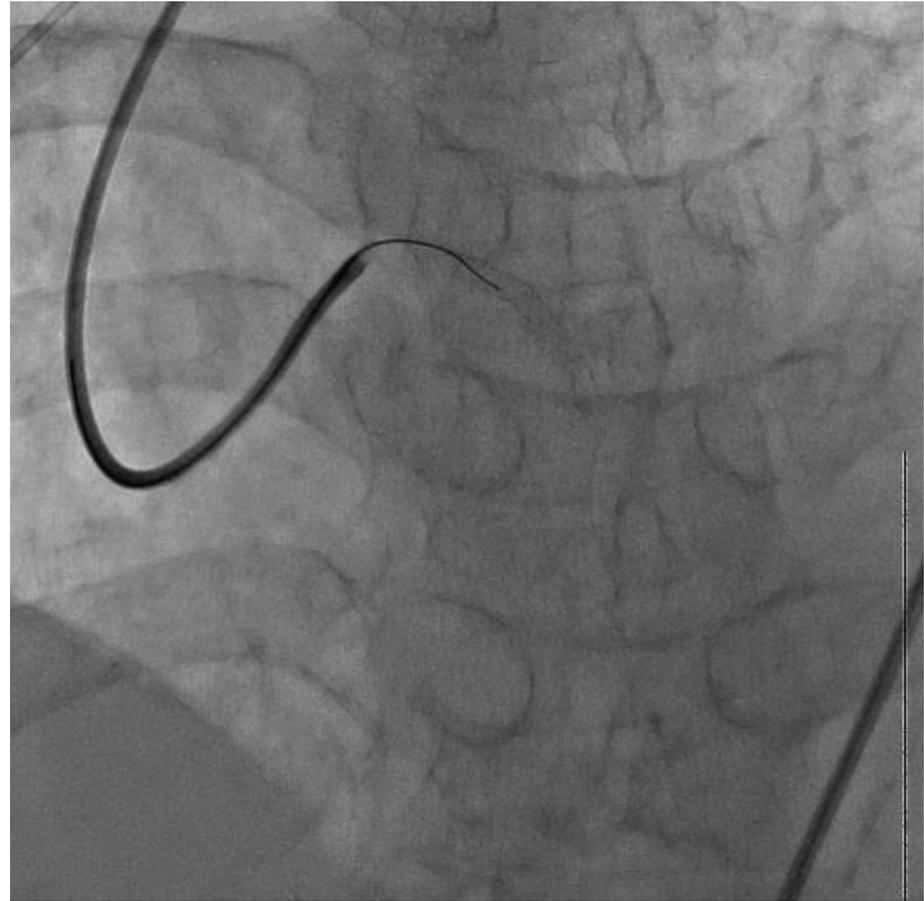
RCA angiogram



PCI



Poor collateral channels from RCA

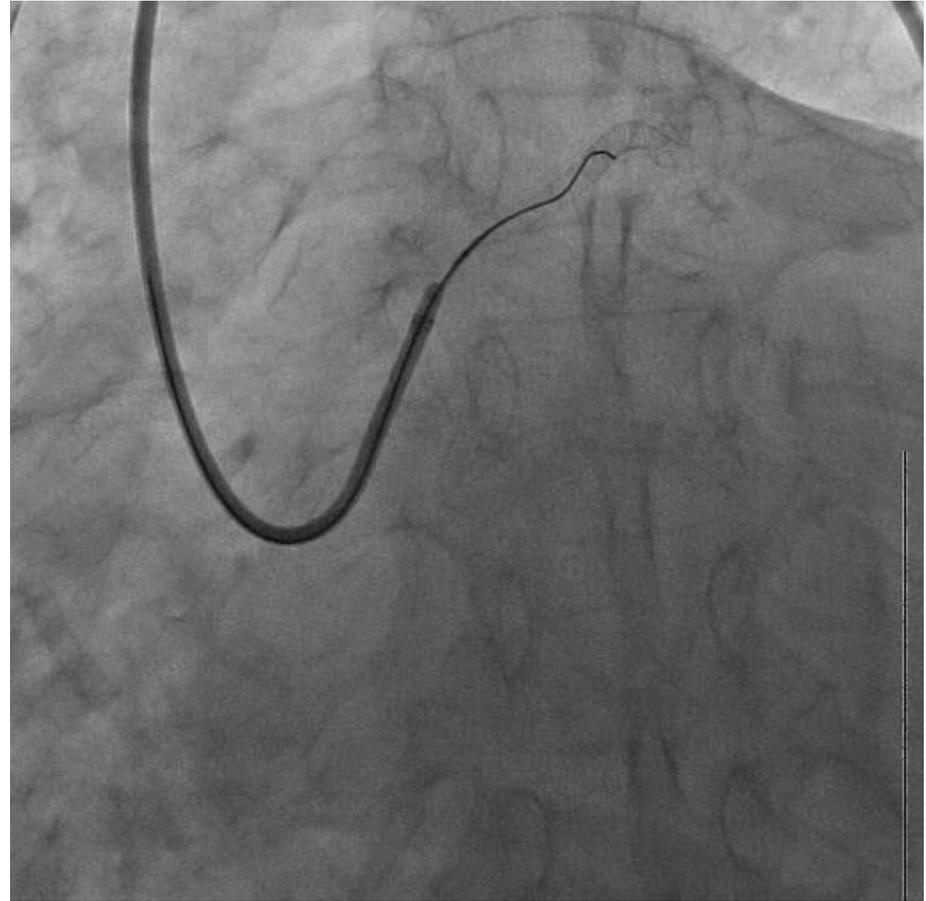
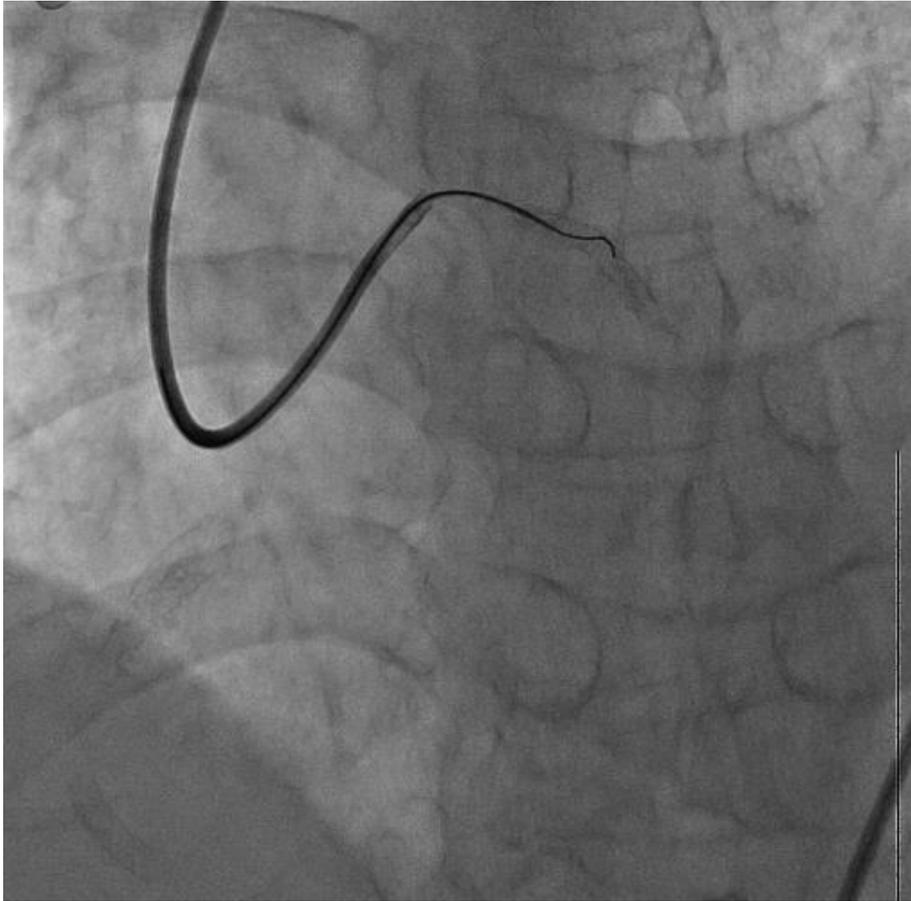


7 Fr EBU3.75 guiding catheter

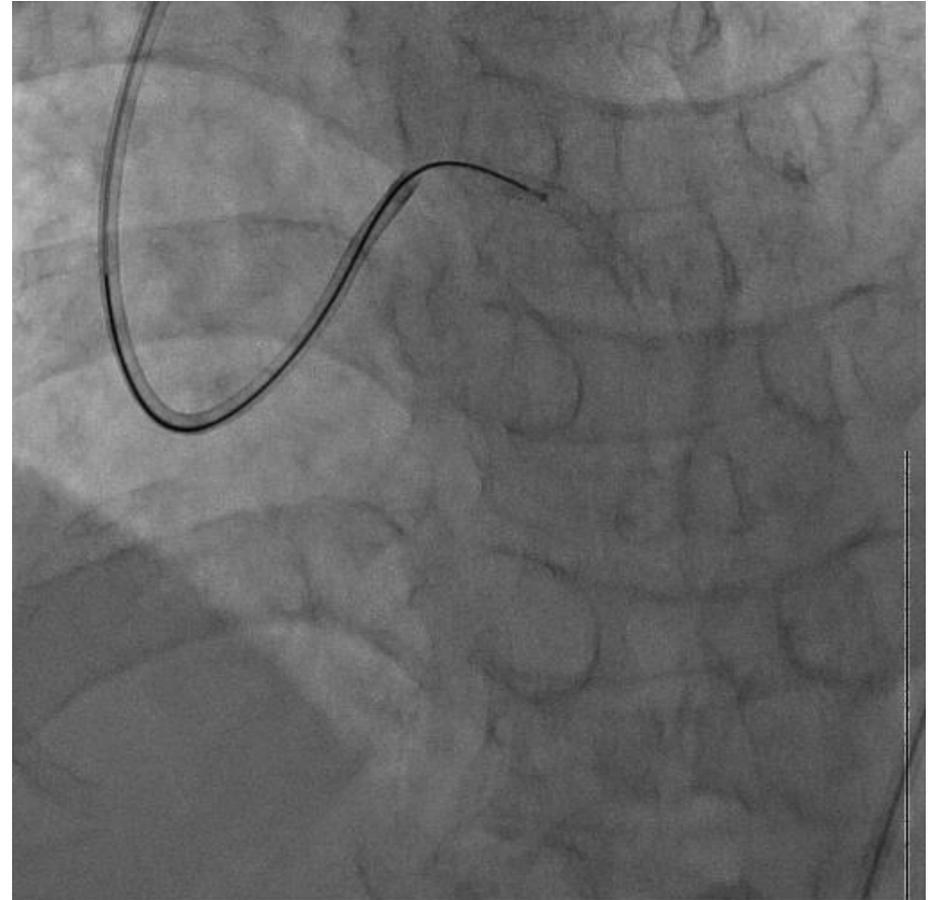
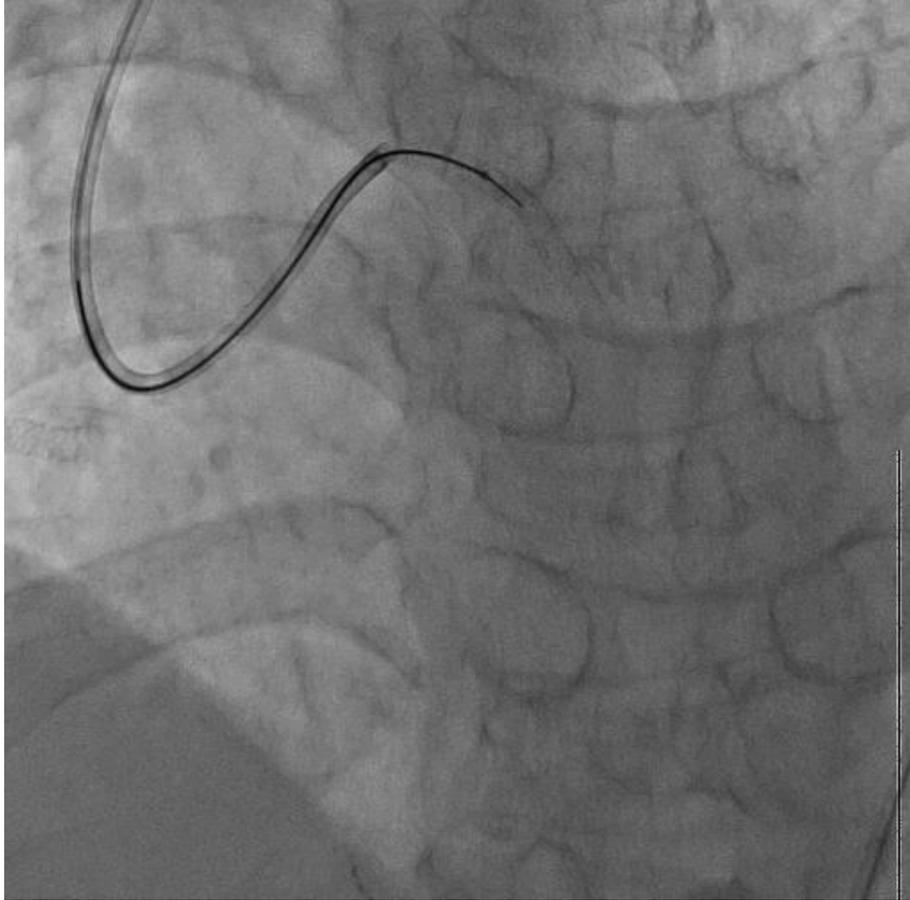
Miracle 6



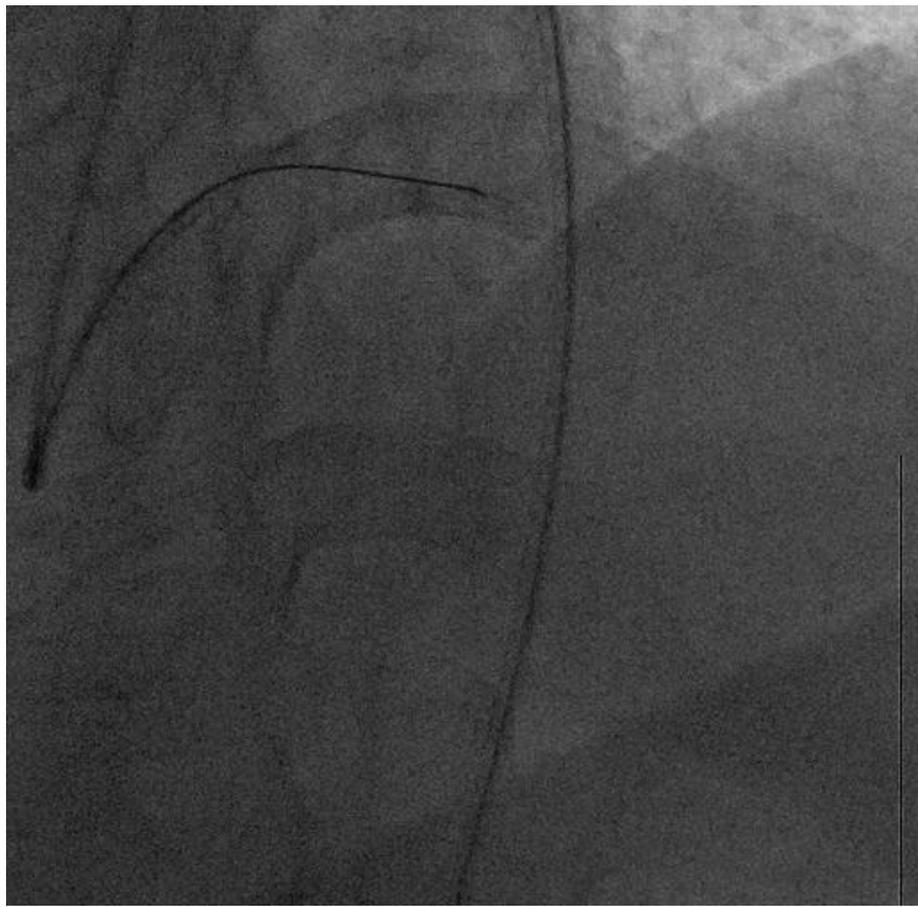
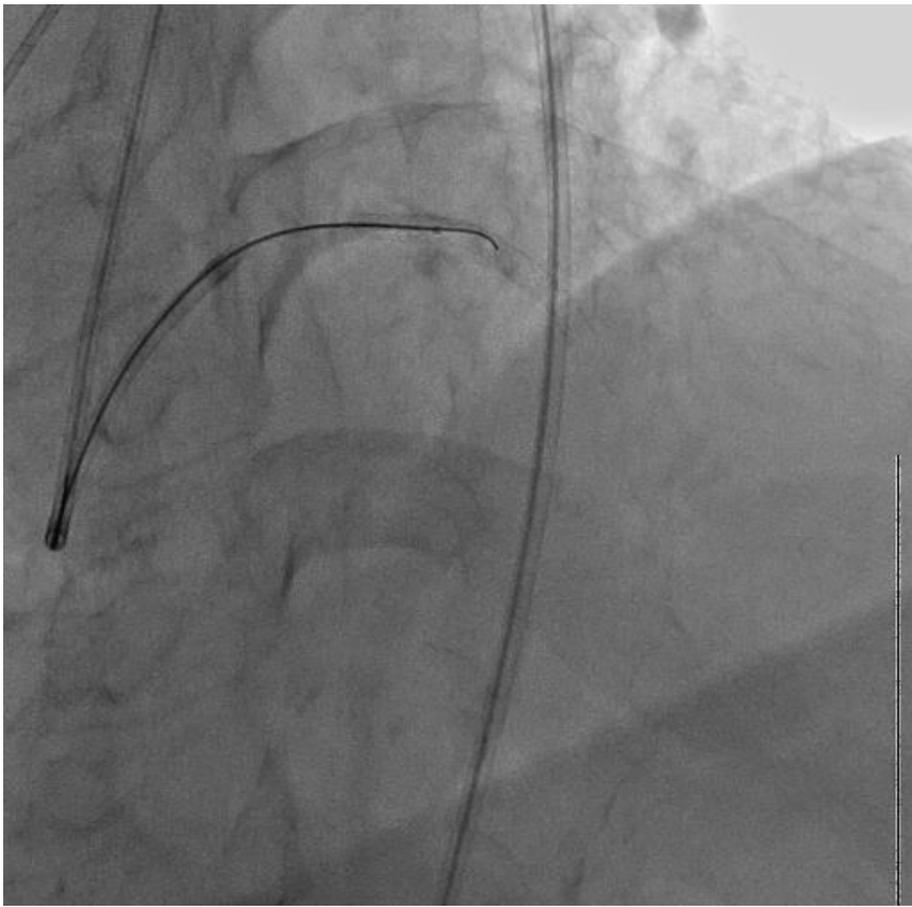
Miracle 6 was in the CTO lesion



**Crossboss catheter was rotated rapidly
using a proximal torque device by digital manipulation**



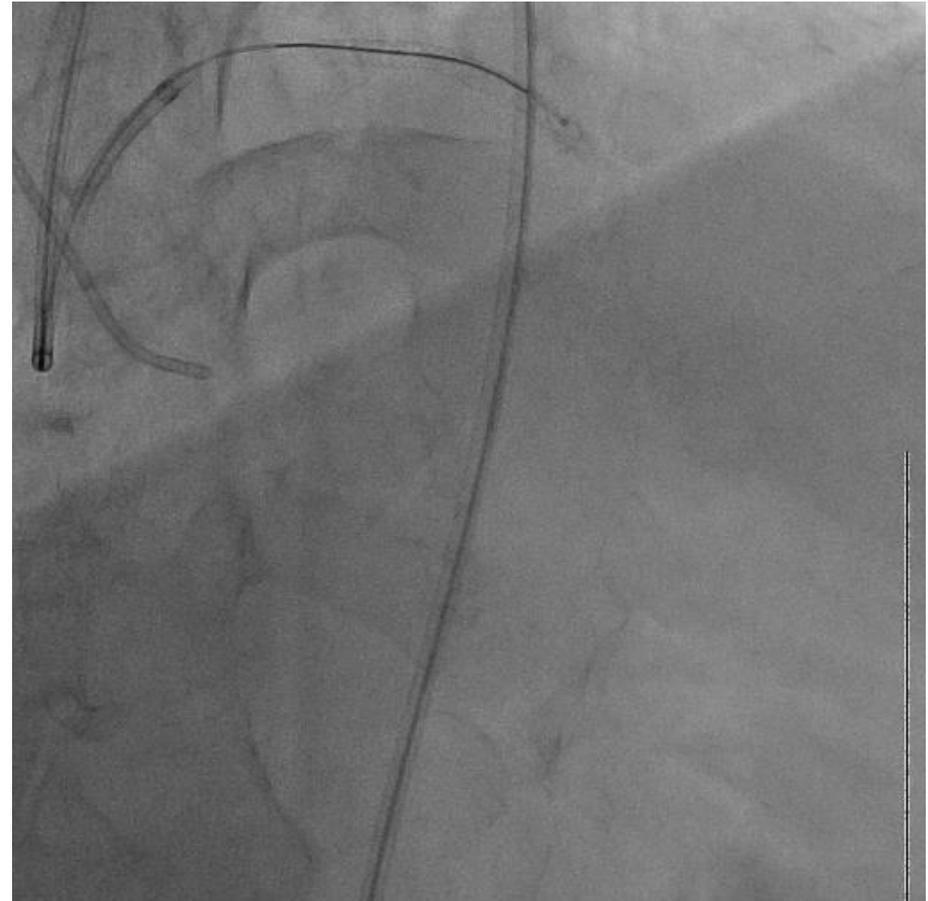
Switched to wire when crossboss suffered with resistance and bending



CrossBoss and wire moved forward alternately



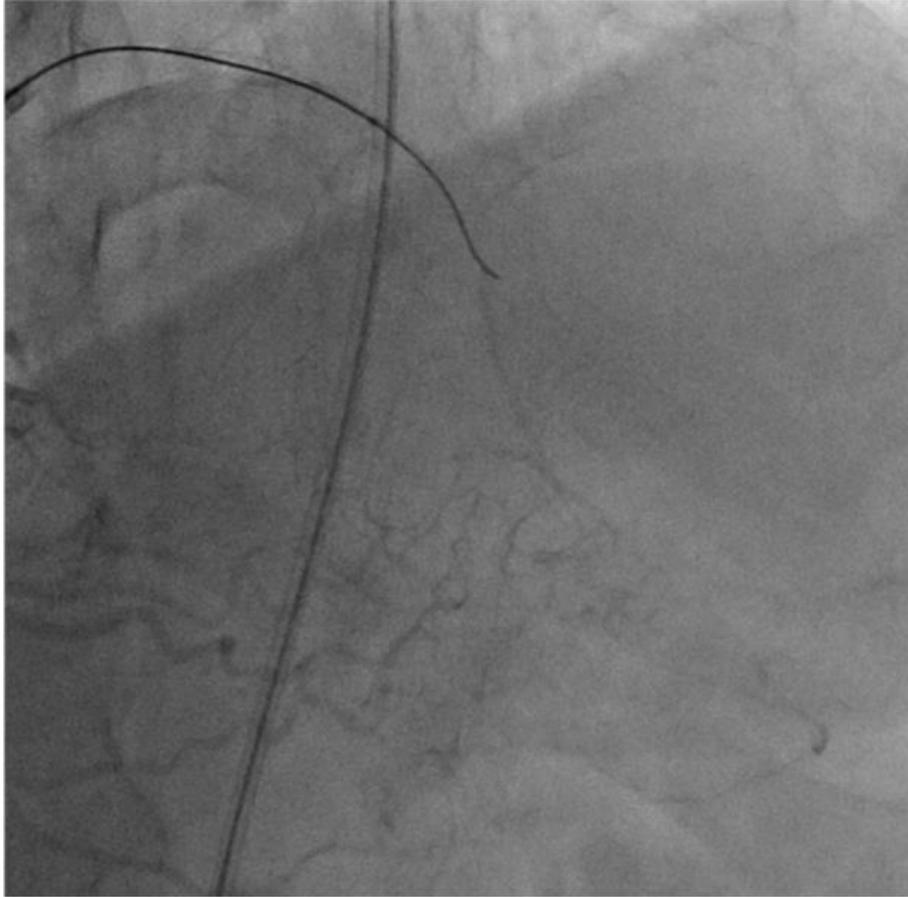
The Crossboss advanced through the occlusion segment in stent slowly and difficulty



Failed to break through the distal fibrous cap



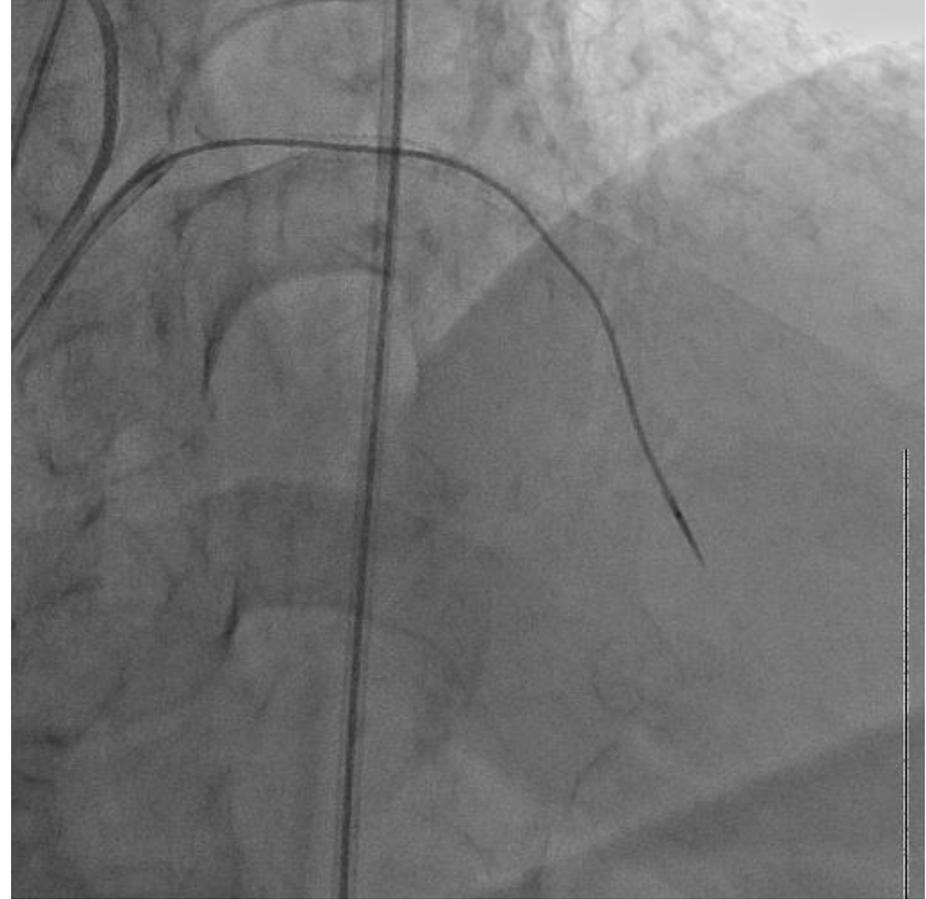
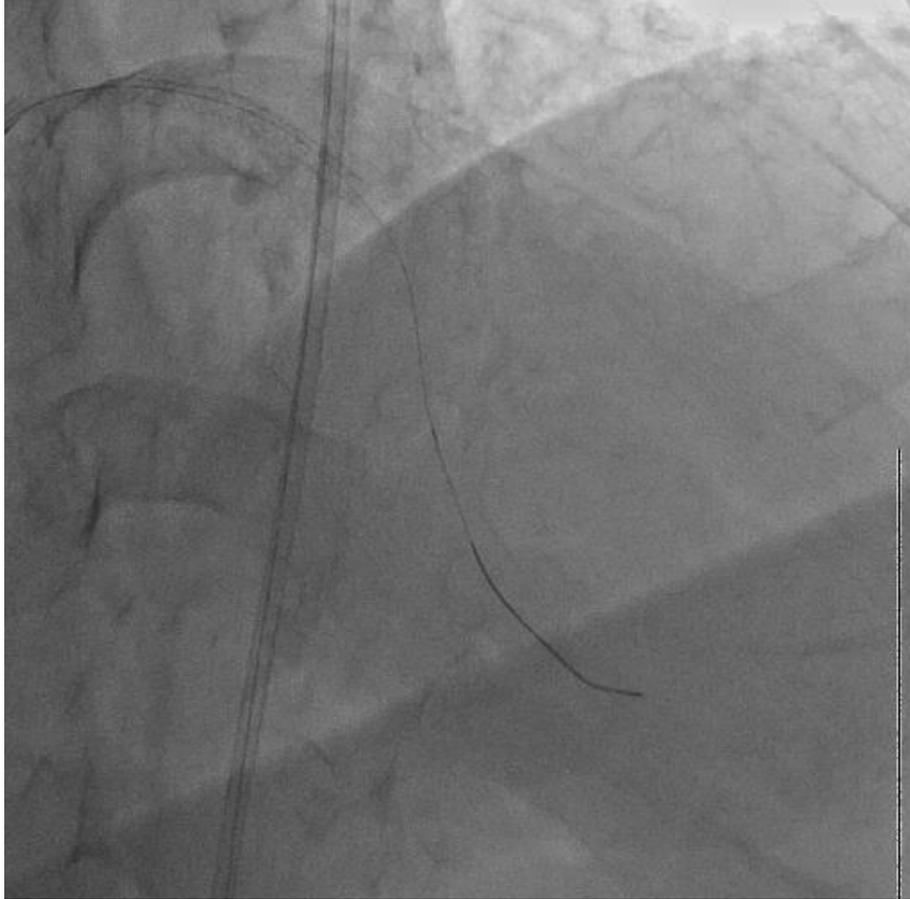
**Miracle 6 entered into sub-intima in
distal occlusion segment outside stent**



**Pilot 150 passed the CTO lesion in
lumen by parallel wire technique**



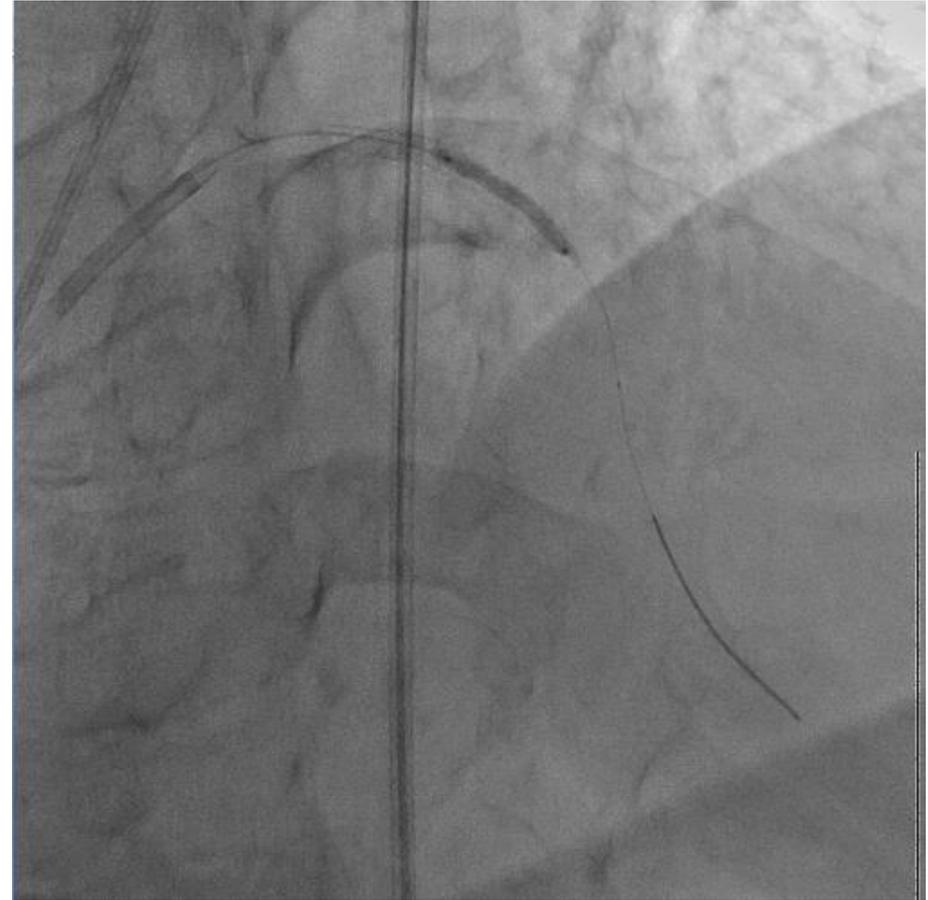
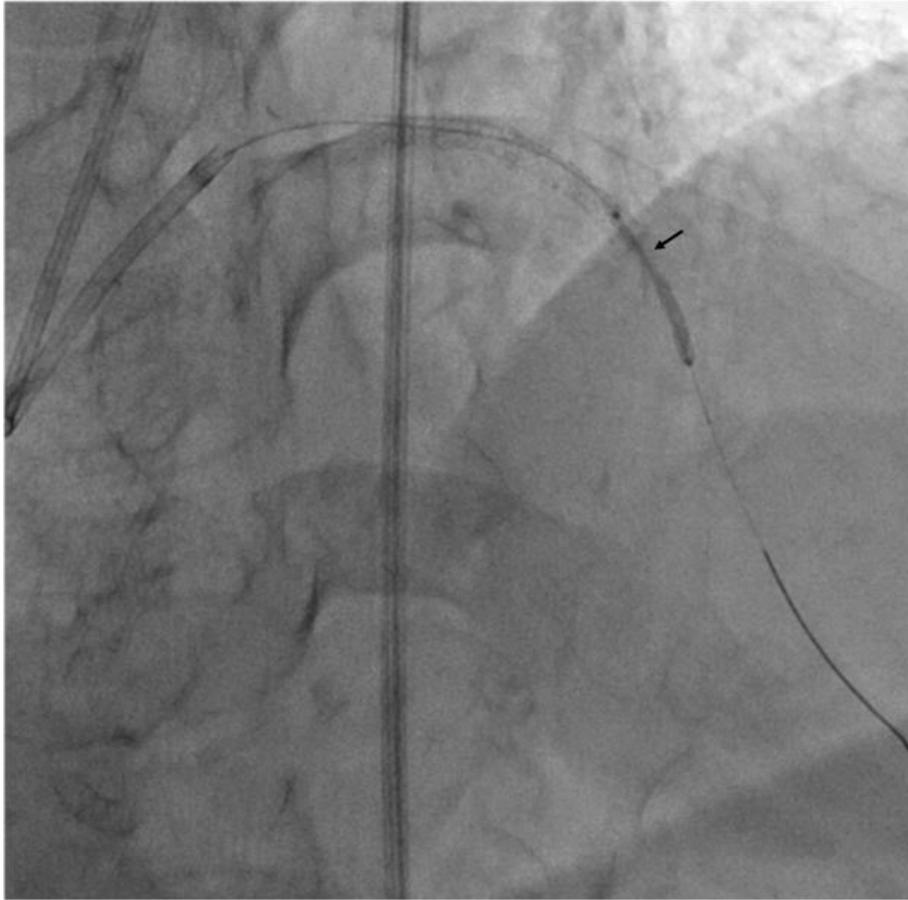
Retrograde angiogram verification



Tip injection to make sure



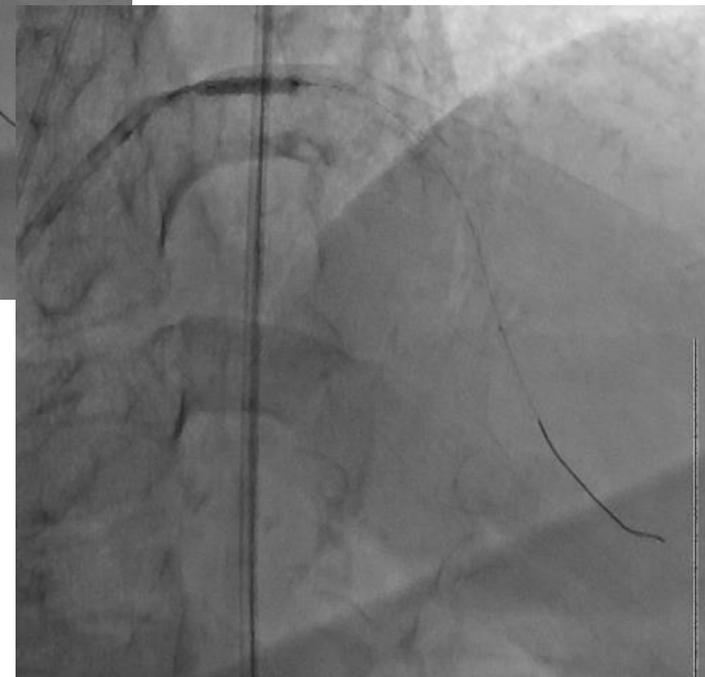
Balloon :Sprinter(2.0mm*20mm)



Predilation and tough plaque was found in distal part of the stent where Miracle 6 lost the right way initially



Balloon :Sprinter(2.5mm*15mm)



Step-up gradual predilatation

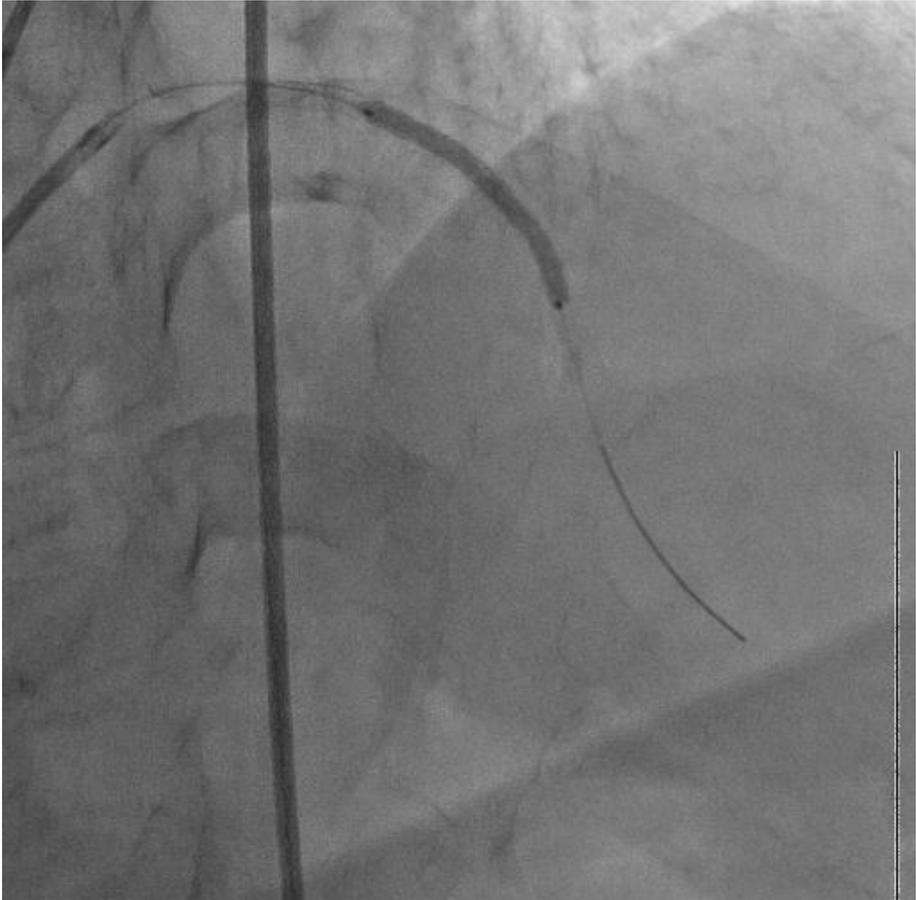
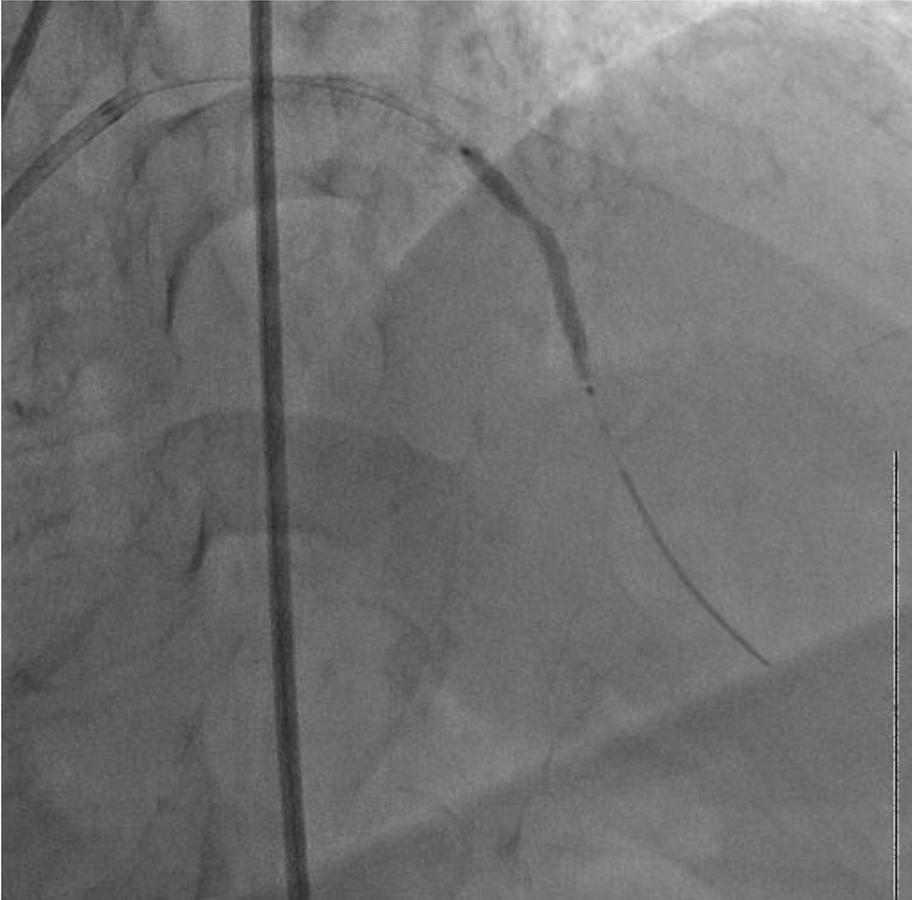


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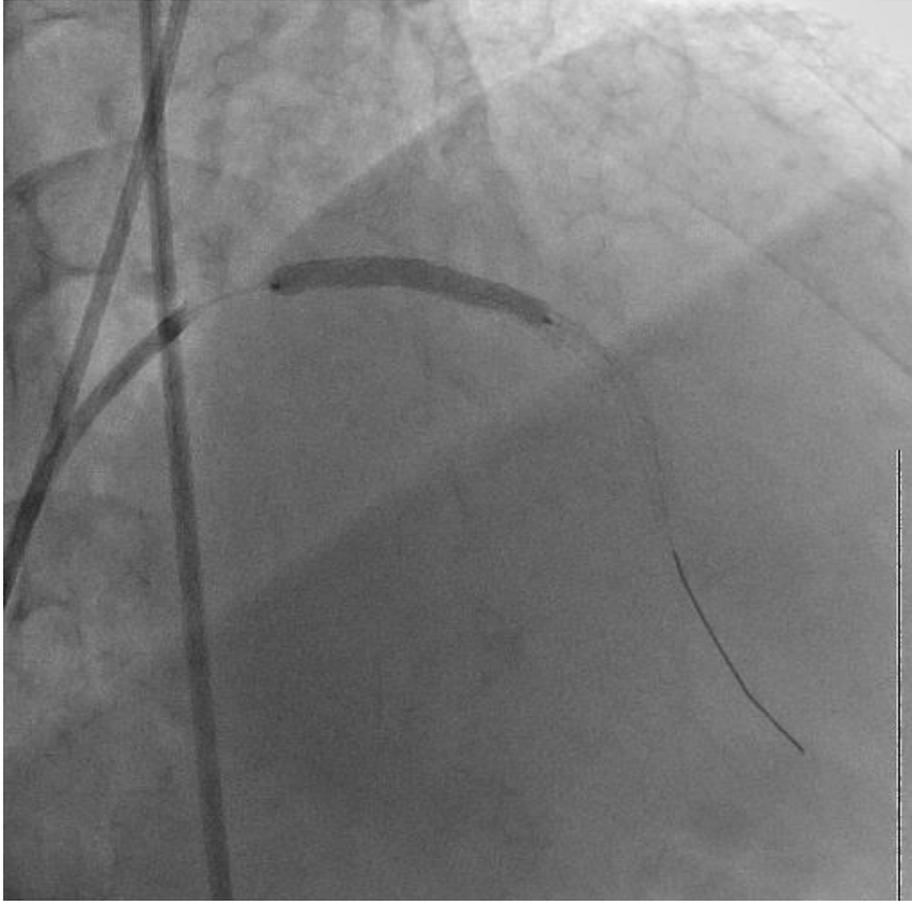
Distal part of LAD was diffuse atherosclerotic narrowing



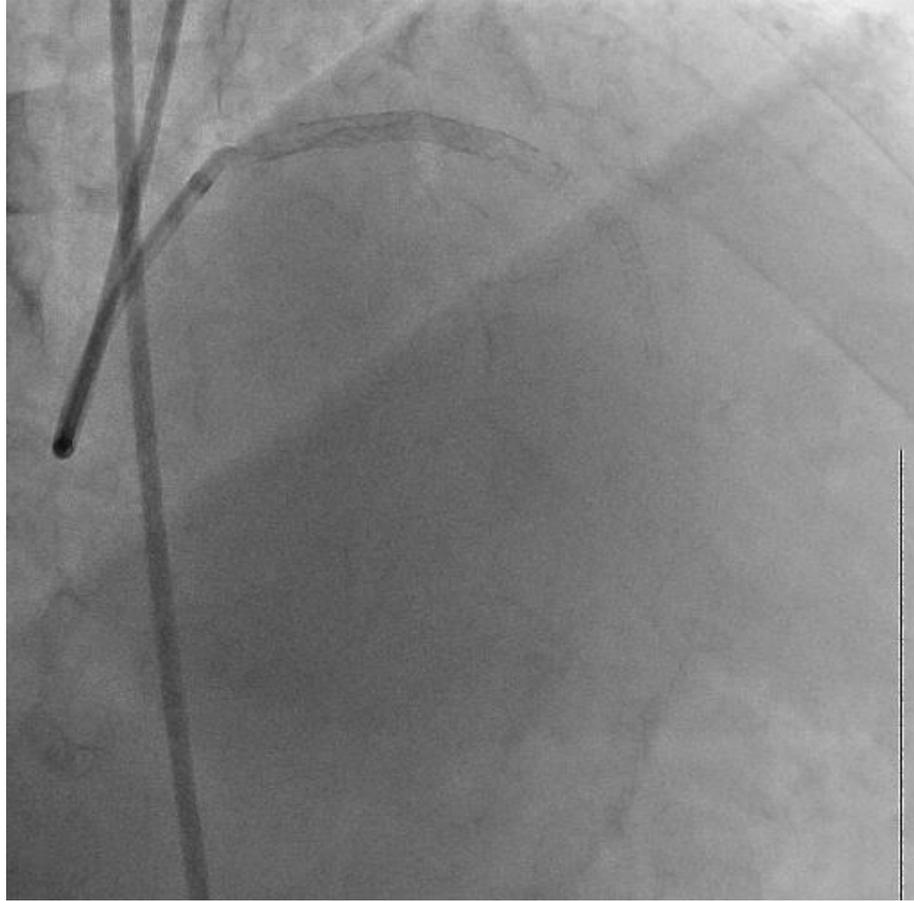
2.5mm × 29mm stent at mid-LAD



3.5mm × 29mm stent at proximal-LAD



Final result



Conclusions

- CrossBoss in CTO due to ISR
 - High success rates
 - Short crossing times
 - Low complication rates
- Particularly suited to tapered proximal cap without significant tortuosity



The Efficacy of “Hybrid” PCI in CTOs Caused by In-Stent Restenosis

PROGRESS CTO registry: 521 patients treated at 5 US high-volume CTO PCI centers, Jan 2012-Sept 2013.

Procedural Outcomes	In-Stent CTOs (n = 57)	De Novo CTOs (n = 464)	P Value
Technical Success	89.4%	92.5%	.43
Procedural Success	86.0%	90.3%	.31
MACE ^a	3.5%	2.2%	.63

^aDeath, Q-wave MI, stroke, TVR, and cardiac tamponade requiring pericardiocentesis

Conclusion: A hybrid strategy incorporating antegrade and/or retrograde approaches increases procedural success of PCI for in-stent CTOs.

Christopoulos G, et al. *Catheter Cardiovasc Interv.* 2014;Epub ahead of print.

CTO due to ISR

- Certain adverse features predict failure
 - Tortuosity
 - Ostial lesions (or side branch at proximal cap)
 - (Calcification)

- The following were not clear predictors of failure
 - Length
 - Diameter
 - Vessel type or position within vessel





*Thanks for
your
attention !*



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