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Mother-and-child catheter induced retrograde dissection of the left main coronary artery during optical coherence tomography examination

Chi Wai Kin

Division of Cardiology

Prince of Wales Hospital

The Chinese University of Hong Kong

Case background

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54 –year-old
Chronic smoker
History of
hypertension on
CCB and ARB

NSTEMI

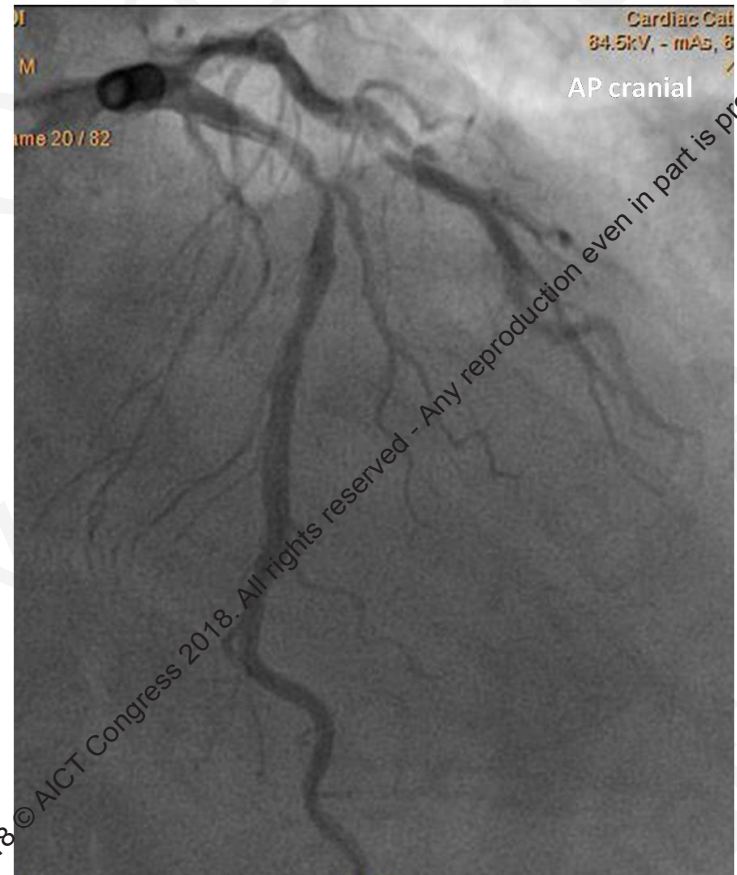
Physical examination
is unremarkable

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ECG: ST
depression over
lateral leads
Troponin T peak
at 42000
CK peak at 2392
LDL 4.91

Coronary angiogram

- 2 vessels disease with severe stenosis in the mid left anterior descending artery (LAD), proximal and distal left circumflex artery (LCx) arteries



- Percutaneous coronary intervention (PCI) to the **LAD** with 3.5x40mm DES was performed under optical coherence tomography (OCT) guidance.
- A 3mm x 40mm drug-eluting stent (DES) was implanted in the **LCx** (initial planned position)

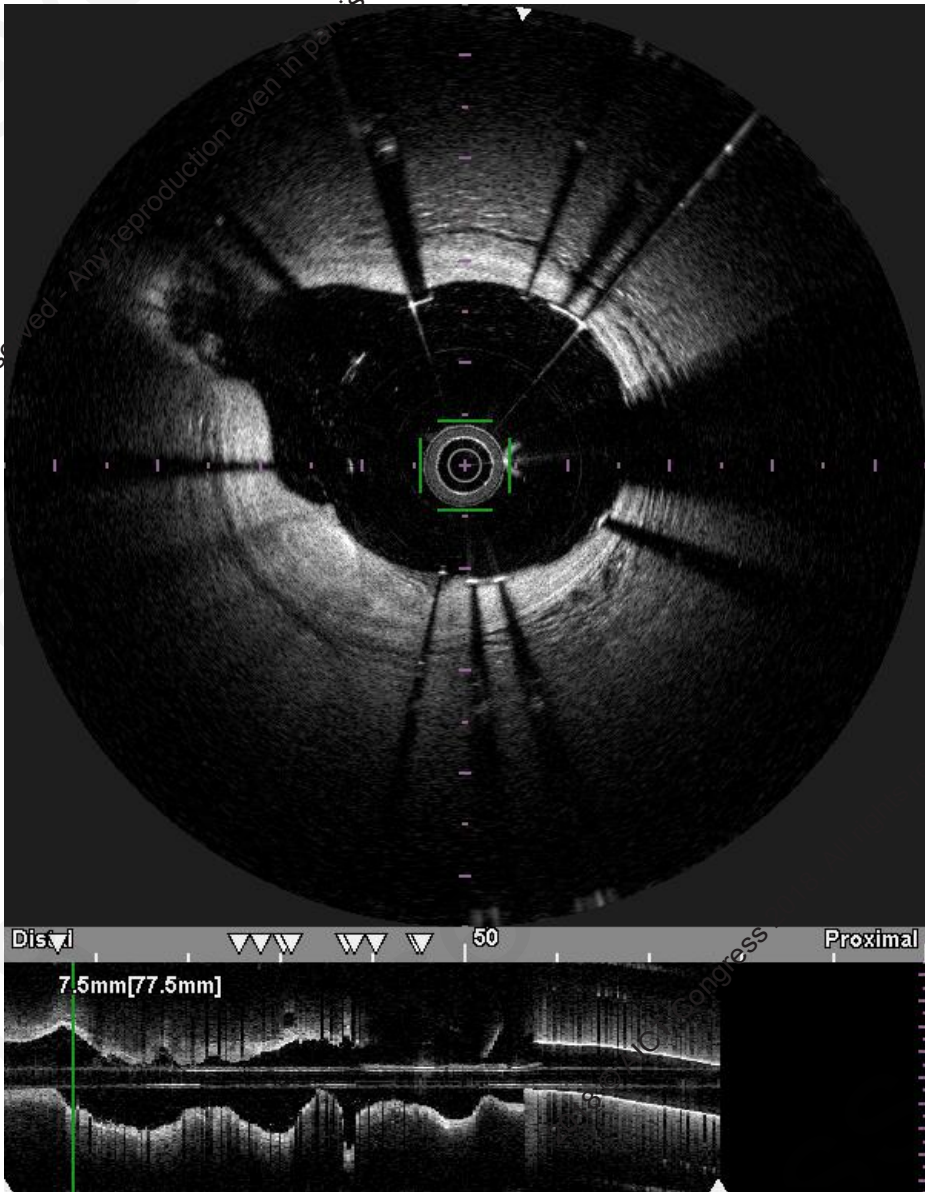


- But landed more proximally than intended due to breathing motion.



Breathing
motion

Gross malapposition of proximal stent

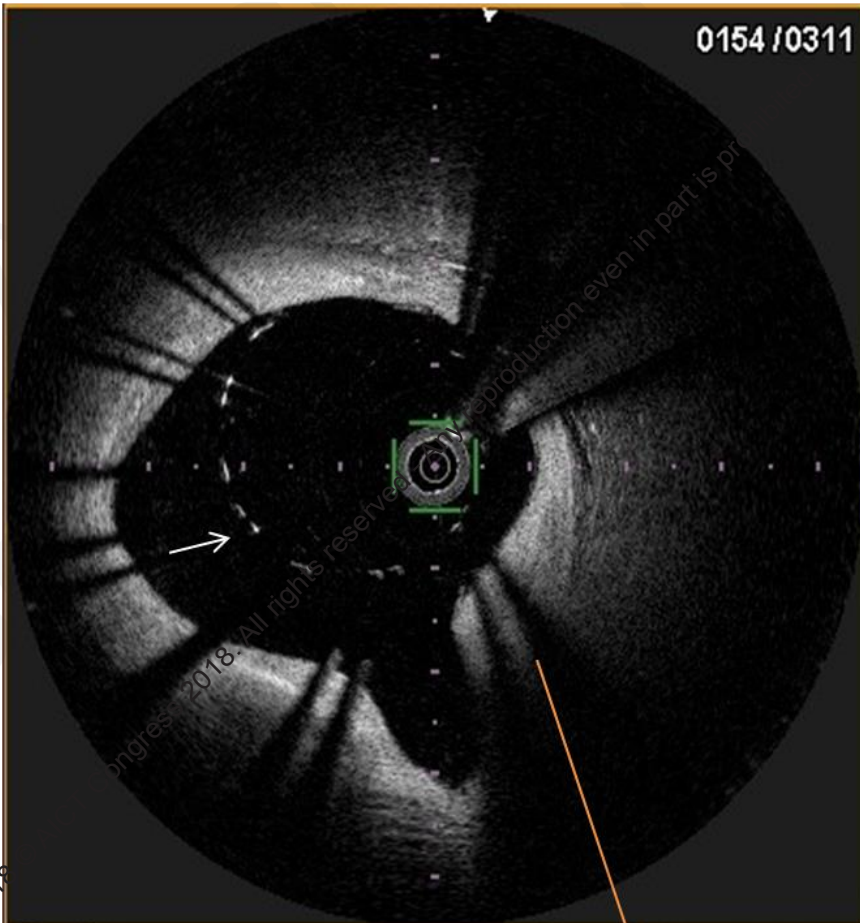


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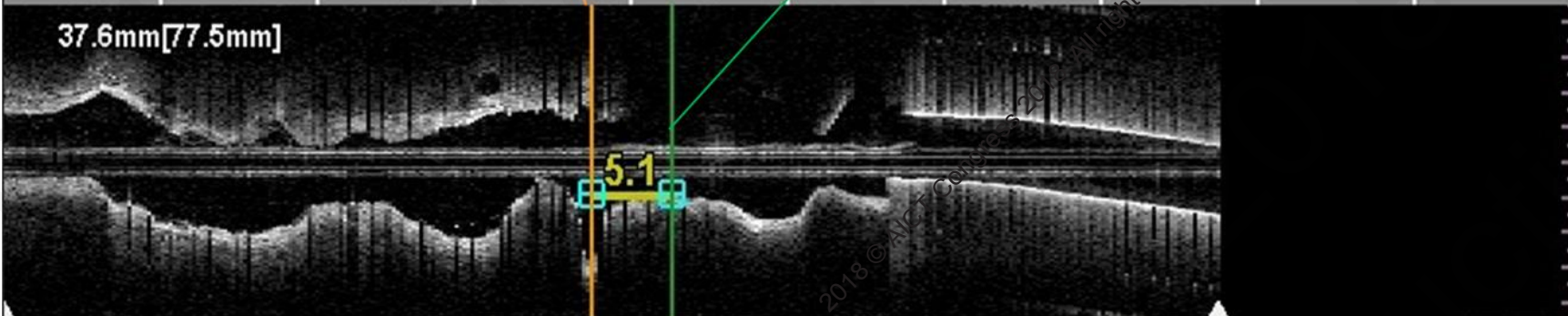
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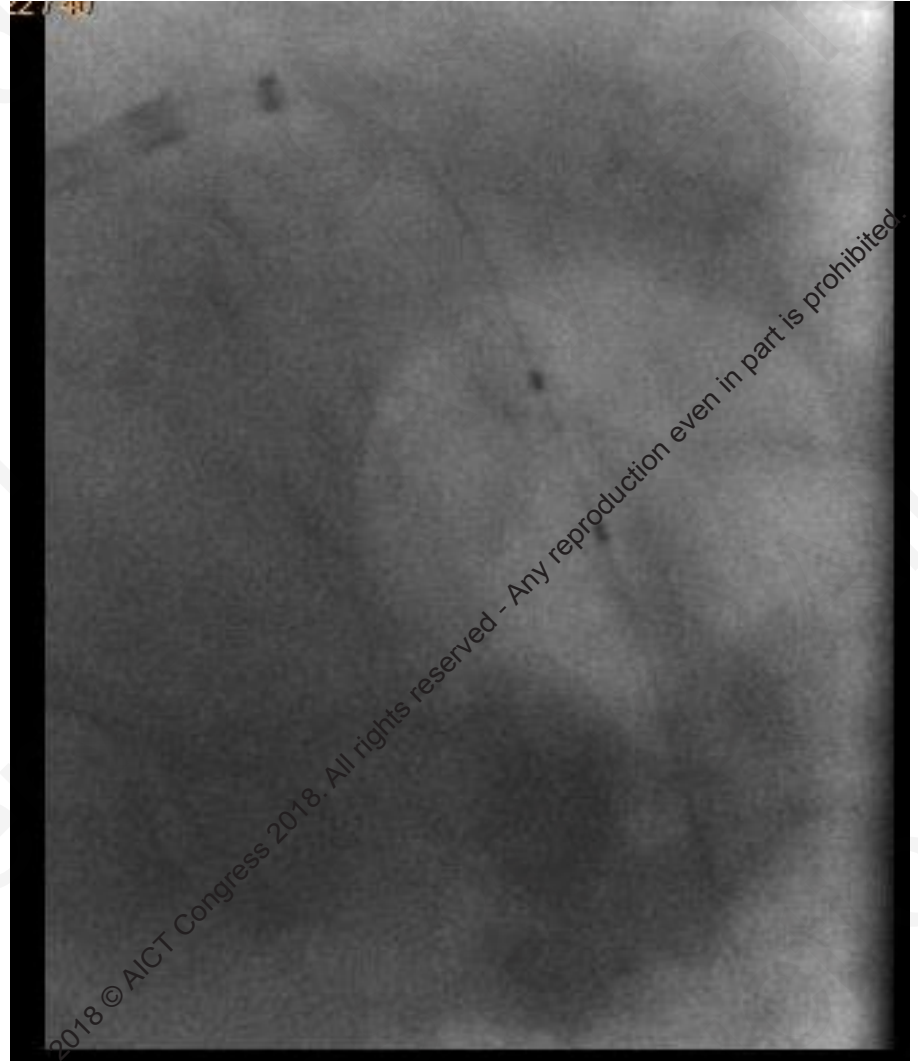
Distal Proximal

37.6mm [77.5mm]



Plan for post-dilatation

- First post-dilated with 3.5NC balloon over proximal stented segment
- **Failed** to pass 4.0 NC balloon despite guideliner support

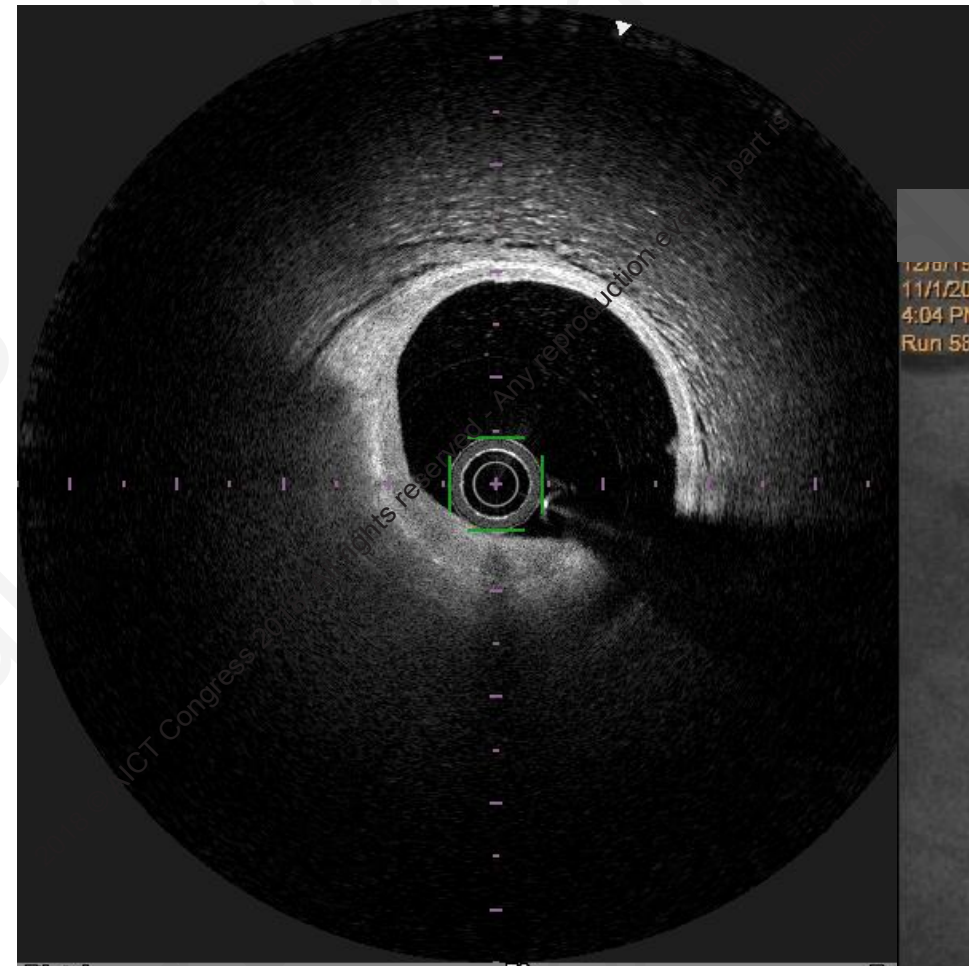


Mother-and-child catheter

- OCT imaging of the LCx after stent post-dilatation was suboptimal due to preferential contrast flow into the large LAD.
- a 6F Guideliner “**Child**” support catheter was inserted into the existing “**Mother**” 6F guiding catheter to provide extra co-axial back-up support.
- **Soft Guideliner tip** was advanced into the proximal LCx to provide selective contrast injection to enhance OCT imaging

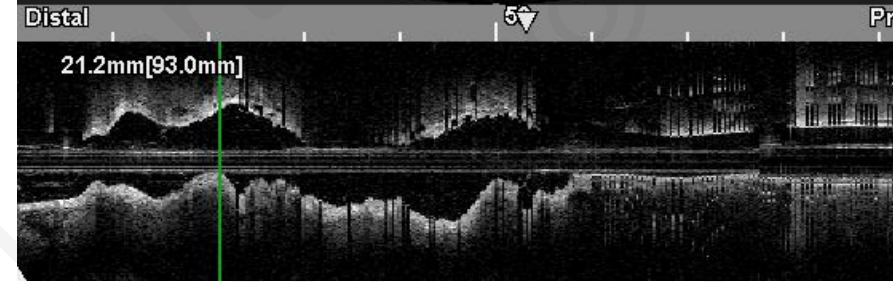
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12/01/1969 m
11/1/2017
4:04 PM
Run 58 - Frame 1 / 59

Cardiac Cath Lab PWH
74.9kV, - mAs, 823mA, 6ms
Zoom 100%



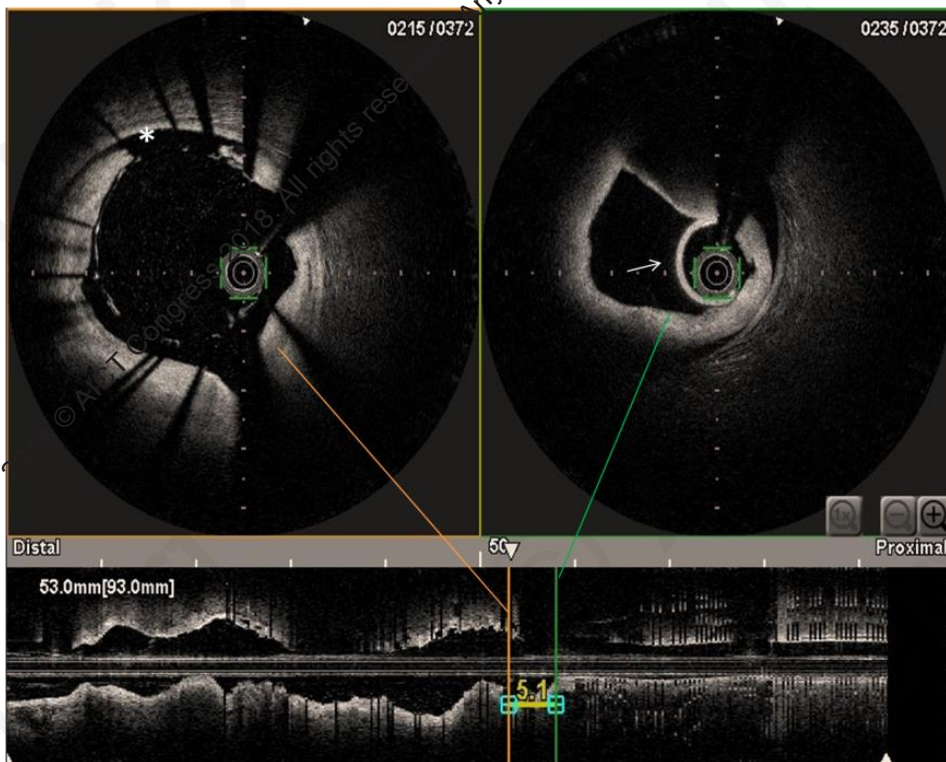
RAO -20.9°
Caudal -20.1°

L 128
W 256

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Hydraulic spiral dissection

- From the proximal LCx extending retrograde into proximal LAD and distal left main (LM) stem



What shall we do next?

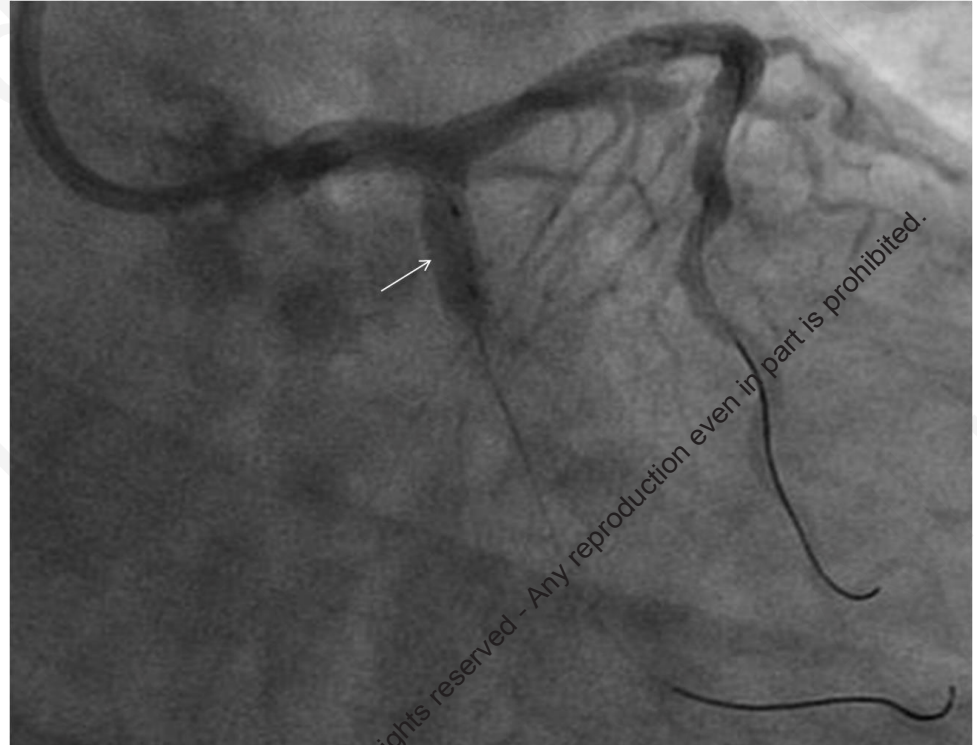


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Balloon occlusion of LCx

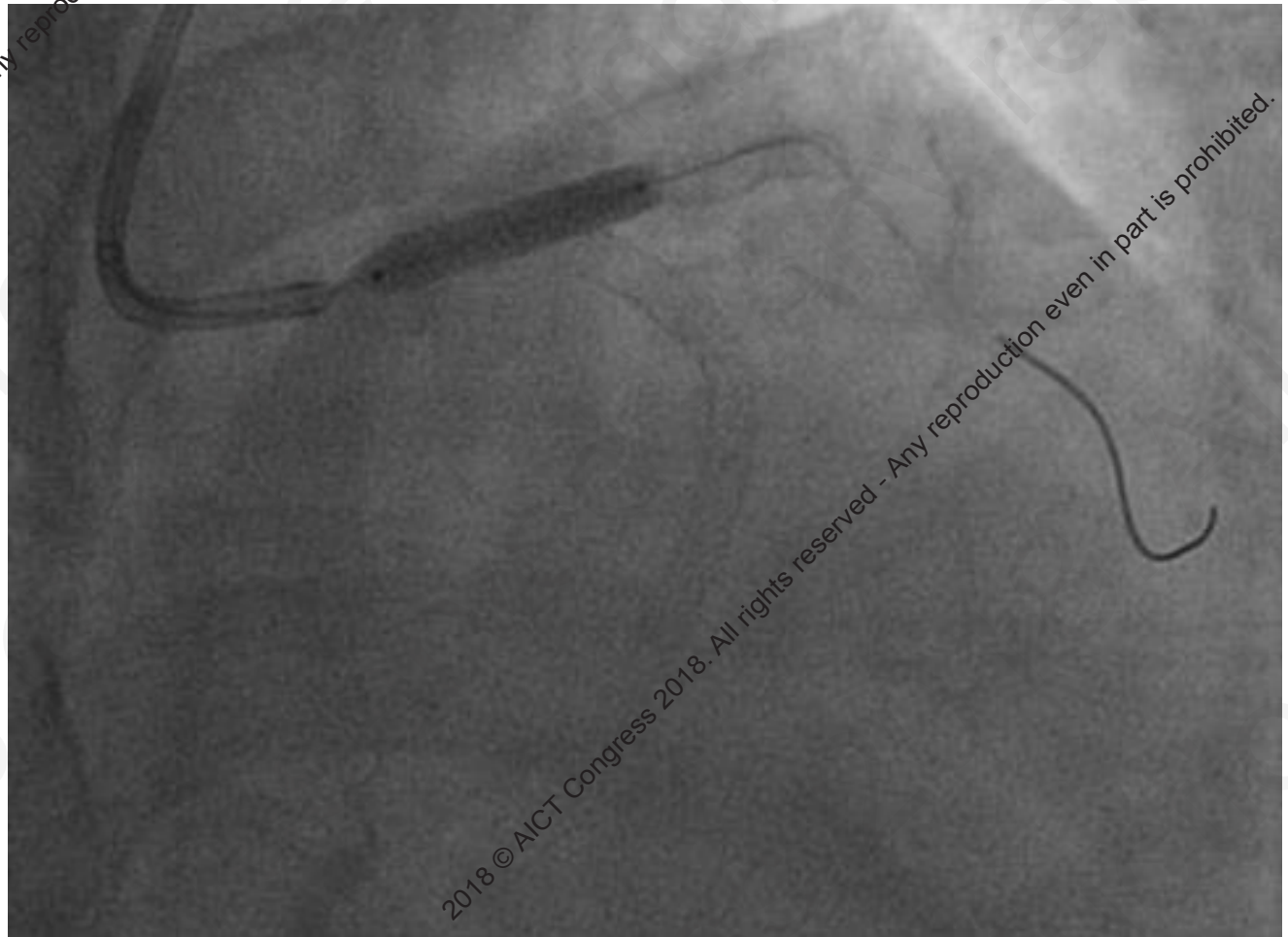
- **Secure the LAD**
- Wire dLAD with rinato
- A 4.0mm semi-compliant (SC) balloon was inflated at the LCx dissection site for 1 minute.
- Subsequent angiogram with balloon occlusion of the LCx showed patent LAD with no contrast staining
- IVUS to LAD showed patent lumen and no dissection flap



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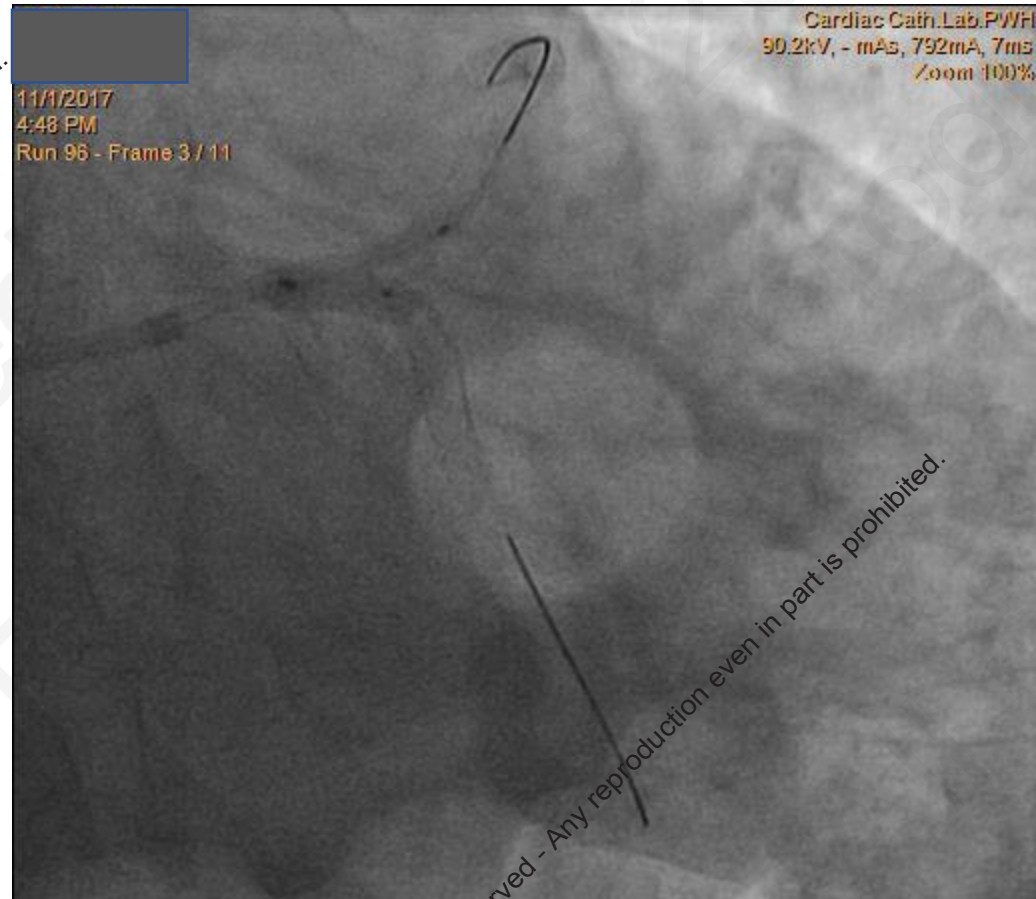
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- A 4mm x 24mm DES was implanted from LM into the LCx overlapping the initial LCx stent, post-dilated with 4.0 NC balloon
- LMS stented portion was post-dilated with 5.0 x 8mm NC balloon



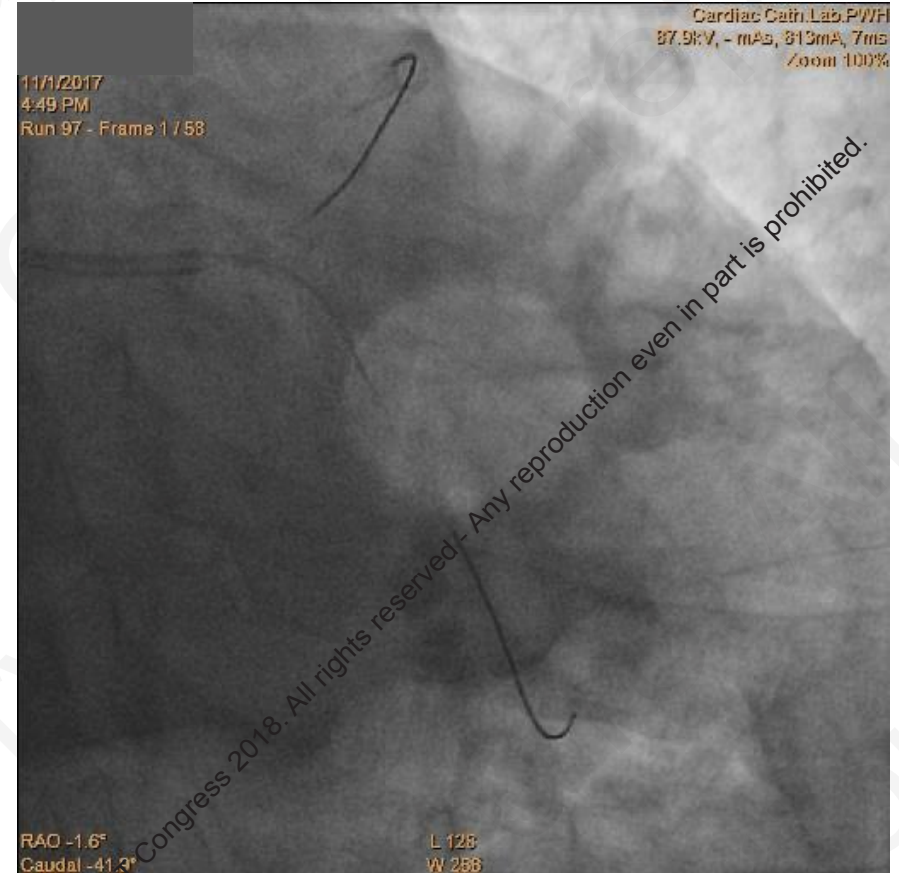
Kissing

- LAD os was opened with NC 2.75 x 15mm balloon
- Kissing with NC 4.0mm at LCx , LAD with NC2.75mm balloon at 6atm



Repeated OCT to LAD showed no free floating dissection and adequate MLA

Final angiographic results

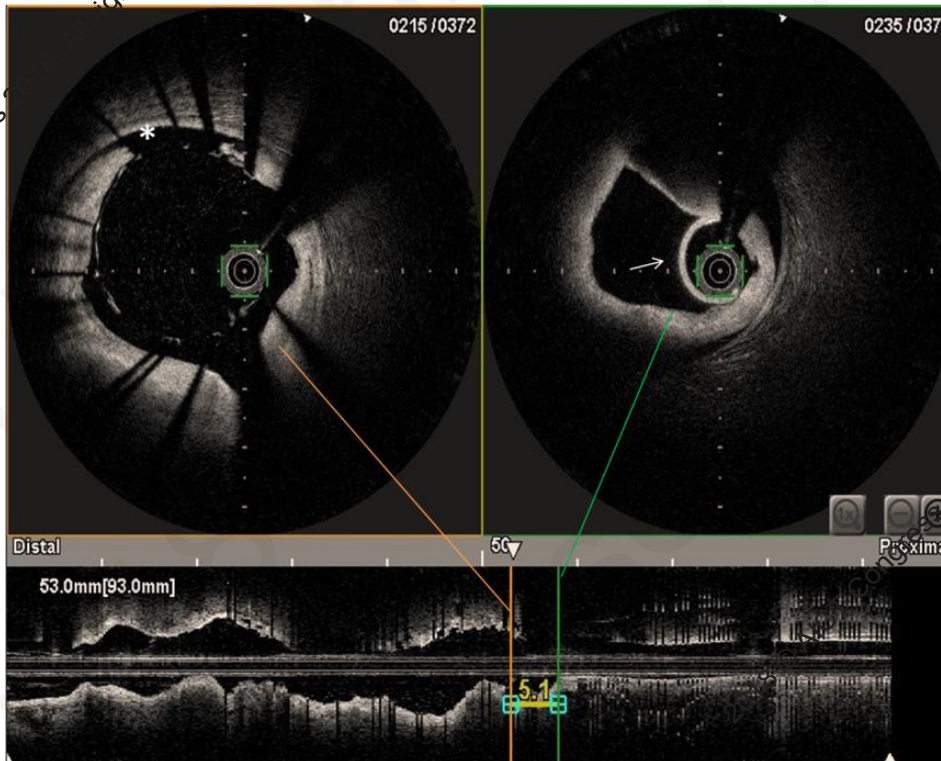


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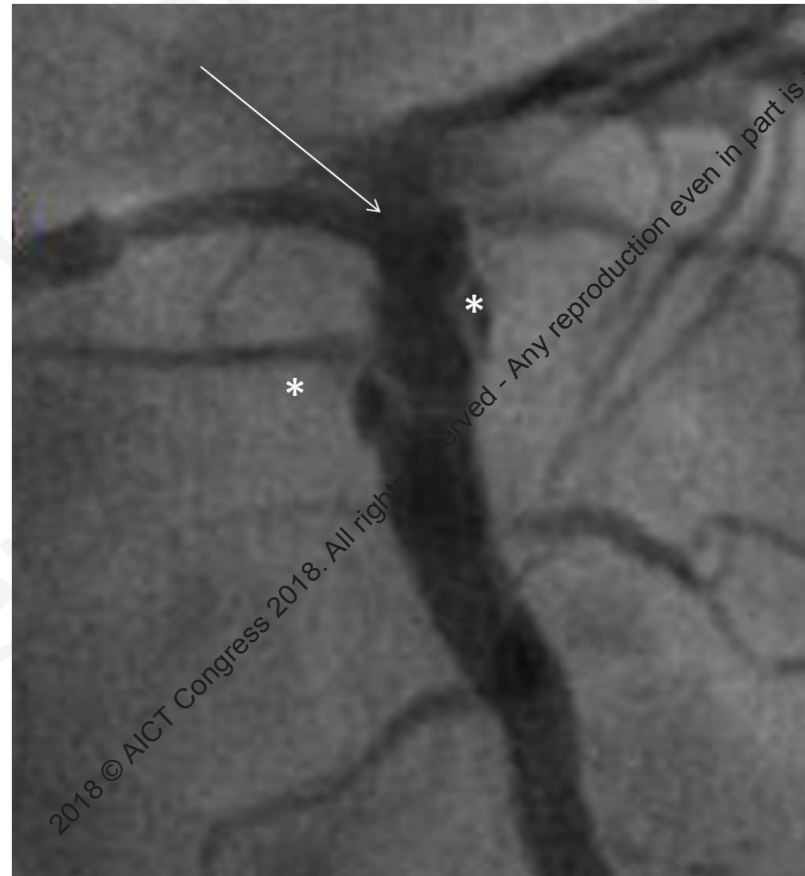
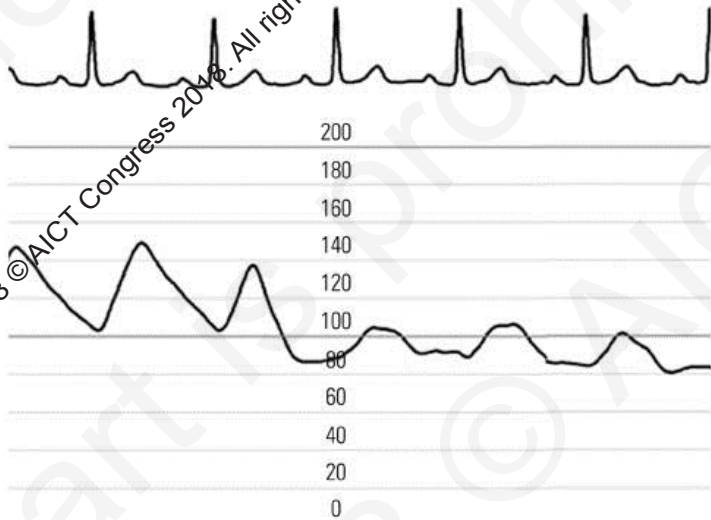
Learning point

- the soft tip of Guideliner was **not coaxial** to the torturous LCx
- **Abutting the vessel wall or plaque** despite no warning of pressure damping before contrast injection during OCT acquisition
- Focal hydraulic pressure generated by short and forceful hand contrast injection could easily **create a crack at a vulnerable plaque** and track into the injury point, resulting in coronary dissection.



Bring Home Message

- Positioning of the Guidewire for OCT acquisition in tortuous vessels requires special attention to avoid iatrogenic dissection.
- Absence of pressure damping **could still carry risk.**



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- Division of Cardiology
- Prince of Wales Hospital
- The Chinese University of Hong Kong

CLINICAL IMAGES

Mother-and-Child Catheter-Induced Retrograde Dissection of the Left Main Coronary Artery During Optical Coherence Tomography Examination

Wai Kin Chi, MBChB; Bryan P.Yan, MBBS; Chi Yuen Chan, MBChB

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KEY WORDS: left main dissection, mother-and-child catheter, optical coherence tomography

A 54-year-old man presented with non-ST elevation myocardial infarction. Coronary angiogram showed two-vessel disease with severe stenosis in the mid left anterior descending (LAD) artery and proximal and distal left circumflex (LCX) artery (Figure 1). Percutaneous coronary intervention (PCI) to the LCX was performed under optical coherence tomography (OCT) guidance. A 3 x 40 mm drug-eluting stent (DES) was implanted in the LCX, but landed more proximally than intended due to breathing motion. As a result, there was gross malposition of the proximal stent as shown by OCT (Figure 2). To facilitate delivery of a 4 mm non-compliant balloon across the malapposed stent, a 6 Fr GuideLiner

"child" support catheter (Vascular Solutions) was inserted into the existing "mother" 6 Fr guiding catheter to provide extra coaxial back-up support. OCT imaging of the LCX after stent postdilation was suboptimal due to preferential contrast flow into the large LAD. Therefore, the soft GuideLiner tip was advanced into the proximal LCX to provide selective contrast injection to enhance OCT imaging. Our practice routinely uses very-short hand injection of 10-12 mL contrast for OCT image acquisition.

Angiography after OCT acquisition showed hydraulic spiral dissection from the proximal LCX extending retrograde into the proximal LAD and distal left main (LM) stem (Figures 3 and 4; Video 2). A 4.0 mm semi-compliant (SC) balloon was immediately inflated at the LCX dissection site for 1 minute. Subsequent angiogram with balloon occlusion of the LCX showed patent LAD with no contrast staining (Figure 5). A 4 x 24 mm DES was implanted from the LM into the LCX, overlapping the initial LCX stent. The final angiogram was

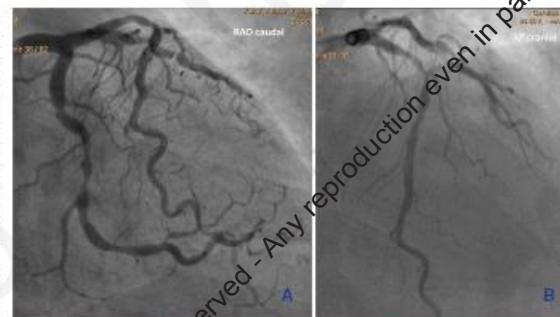


FIGURE 1. Left coronary angiogram in (A) right anterior oblique caudal view and (B) anteroposterior cranial view.

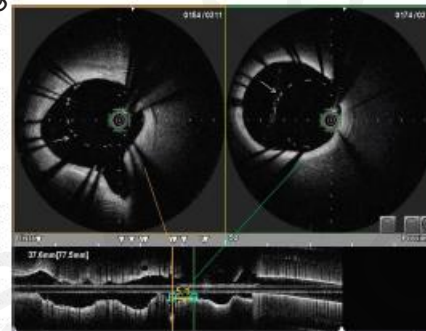


FIGURE 2. Post-stenting optical coherence tomography showed stent malapposition (arrow).

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