

**2017**  
**COMPLEX PCI**

**Complex PCI for Acute Coronary  
Syndrome with Cardiogenic  
Shock (3VD with LM )**

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**Kaohsiung Medical University Hospital**



2017-11-30



**No conflicts of interest**

# Clinical History

- 81 year-old man presented with sudden onset of anterior chest pain & short of breath on July 2, 2017
- Past History:  
Hypertension, diabetes mellitus (HbA1c: 7.7%),  
dyslipidemia
- Serial cardiac enzymes:

|                   | 7/3 4:07 |
|-------------------|----------|
| CPK(IU/L)         | 2647     |
| CK-MB(ng/ml)      | 249.4    |
| Troponin-I(ng/ml) | >80      |

# OPD medication in his original hospital, KMTTH (Kaohsiung Municipal Ta-Tung Hospital)

- **Cardiovascular OPD**

- Aspirin 100mg 1# QD
- Rosuvastatin 10mg 1# QD
- Bisoprolol 5mg 1# QD
- Lercanidipine 10mg 1# QD
- Valsartan 80mg +  
hydrochlorothiazide 12.5mg  
1# QD

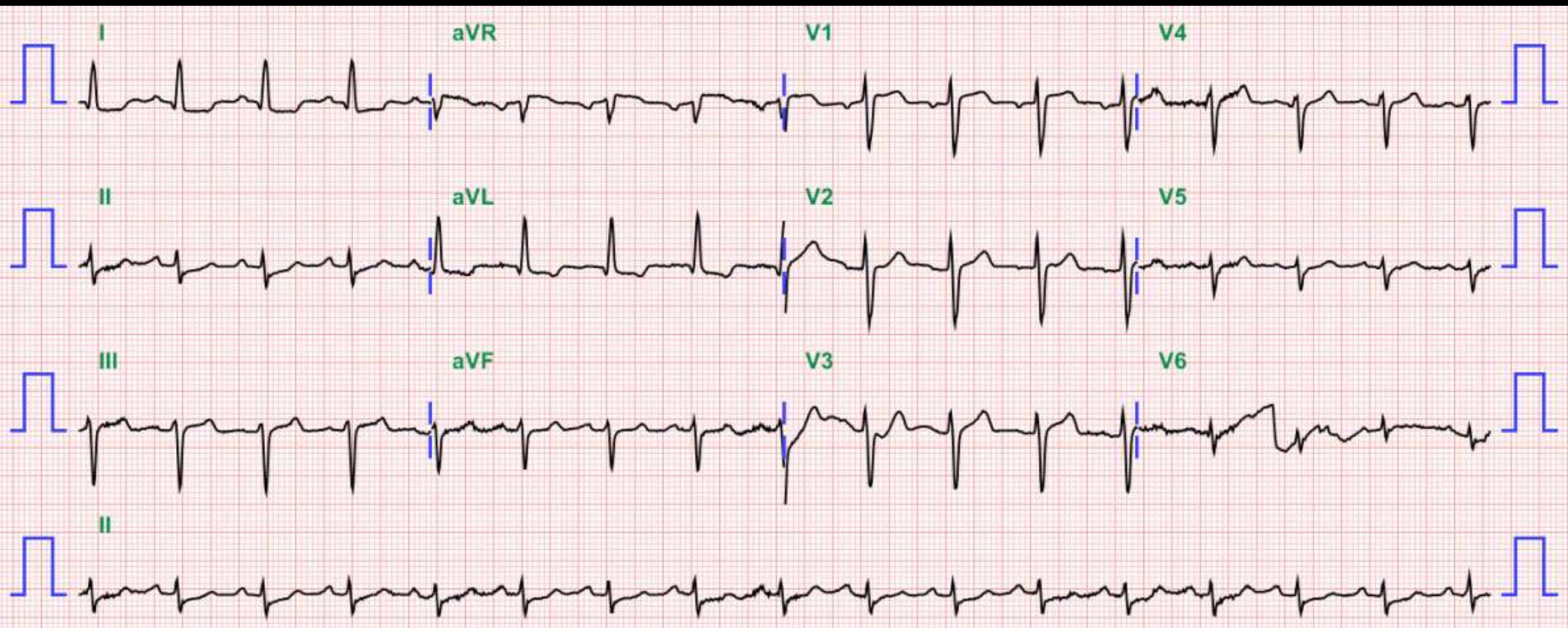
- **Endocrine OPD**

- Metformin 500mg  
2# AM 1# NN 1# PM
- Repaglinide 1mg 1# TIDAC
- Saxagliptin 5mg 1# QD
- Dapagliflozin 10mg 1# QD

- **2015/11/2 Echocardiography**

- Concentric LV hypertrophy
- Normal LV systolic function  
(LVEF: 77%),
- Impaired LV relaxation

# EKG (2017/7/2 17:54:11)

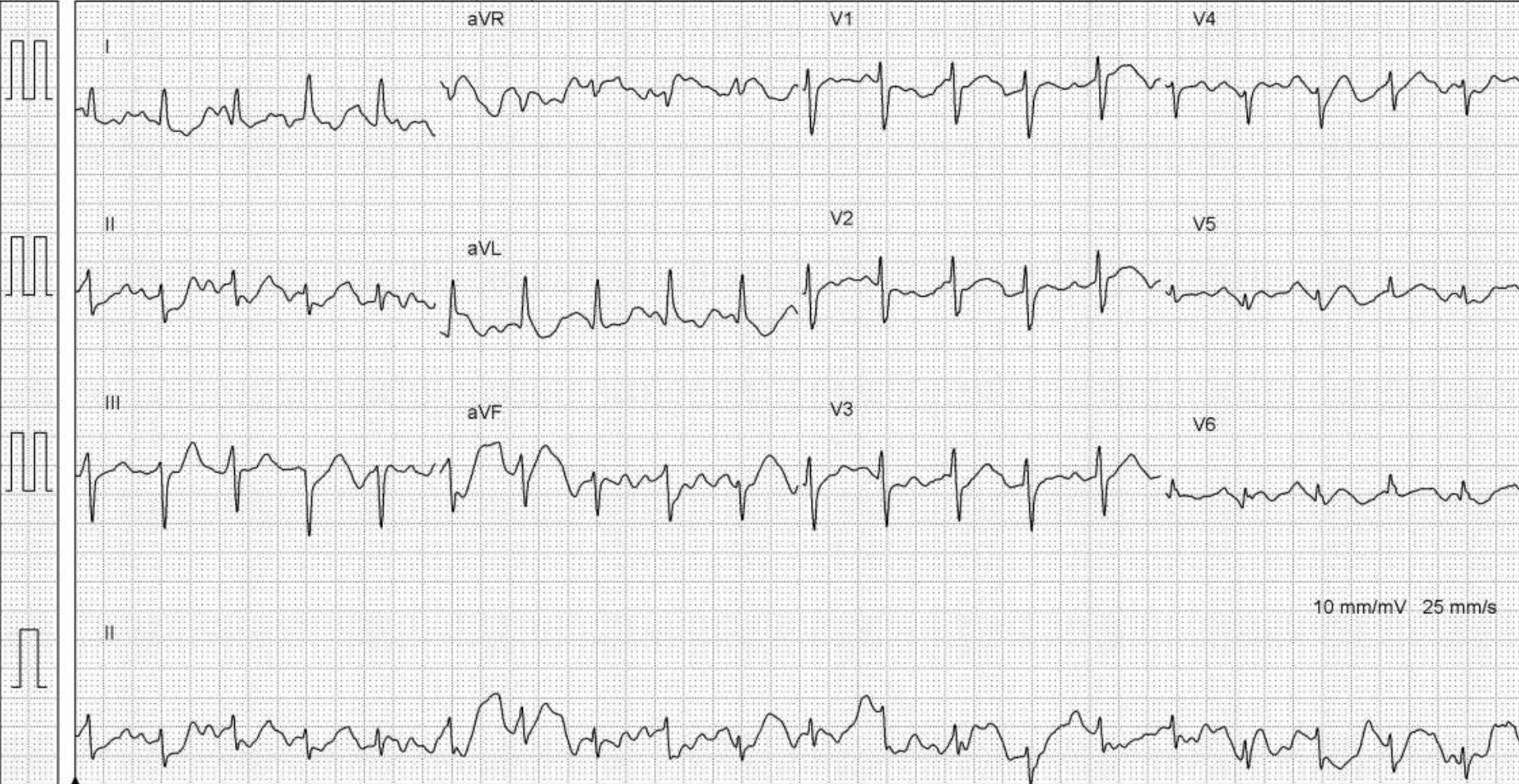




# EKG (2017/7/2 22:08:29)

10.00 mm/mV 25.0 mm/s 25 Hz Continuous (3chx4)

10.00 mm/mV 25.0 mm/s 25 Hz



# CXR: Acute pulmonary edema

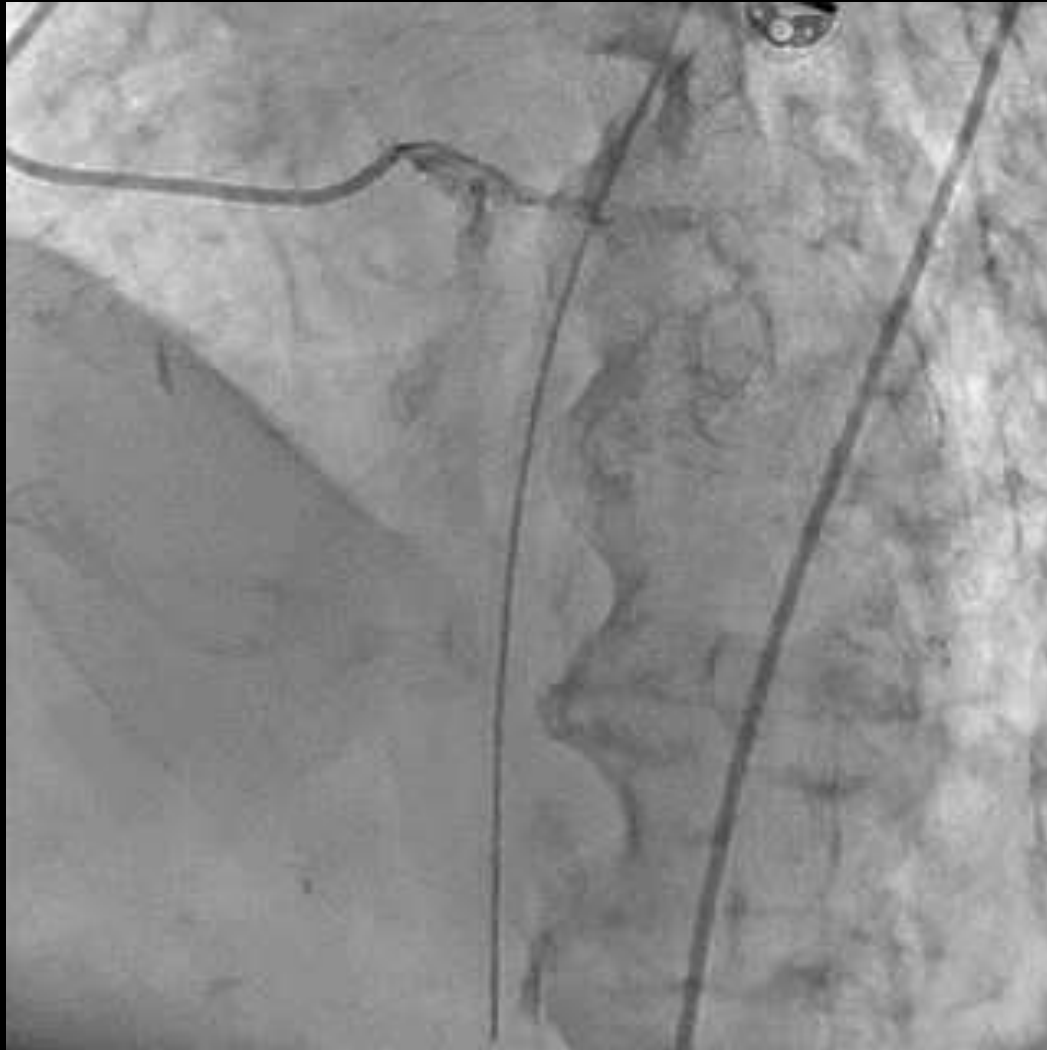


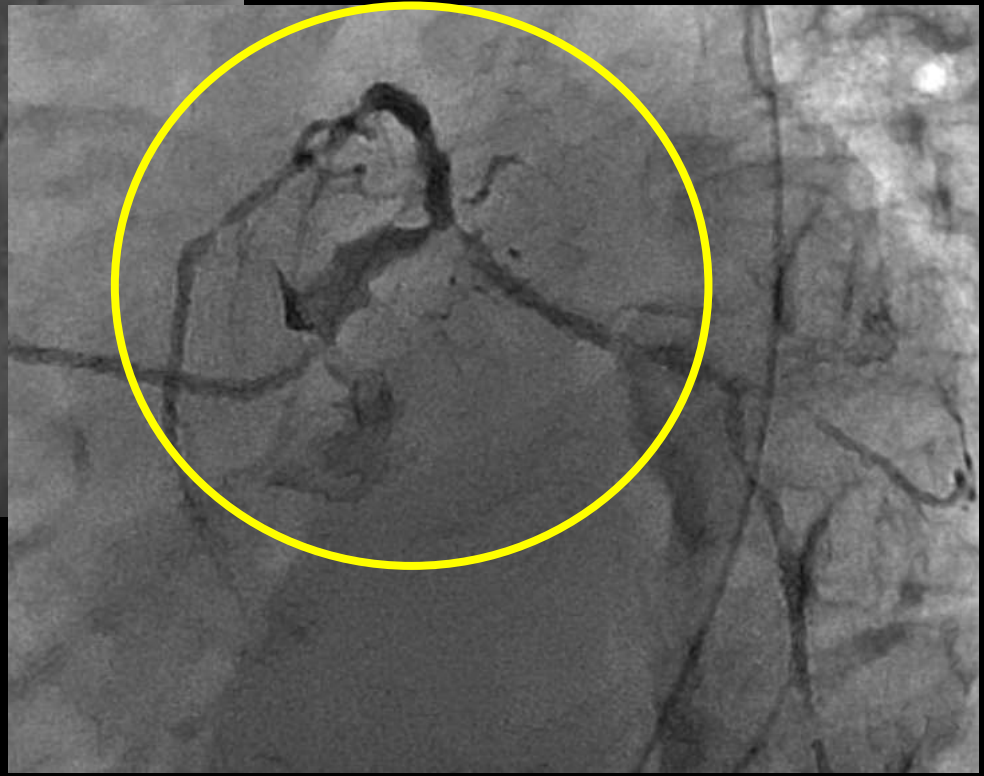
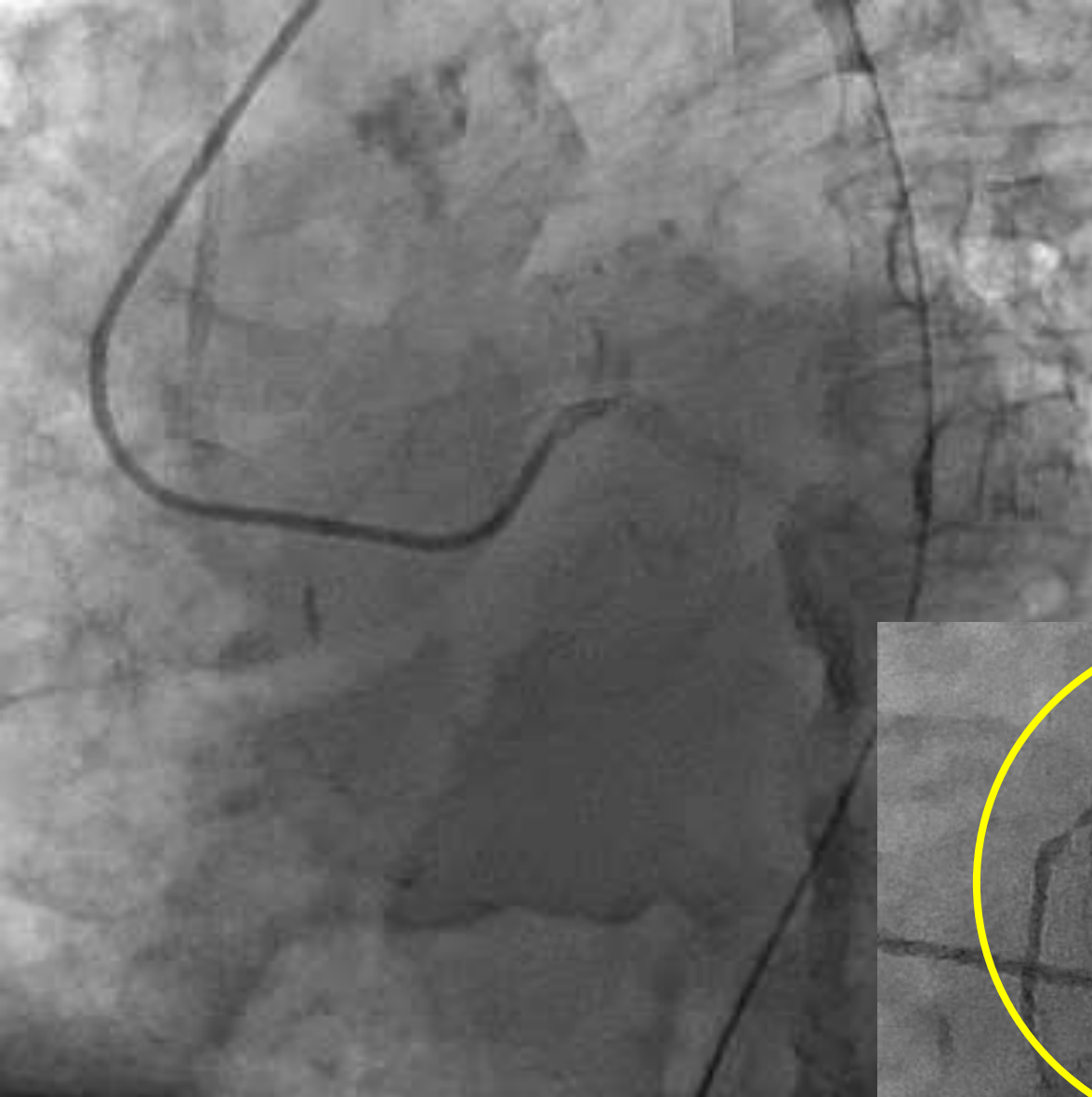
# Clinical Course

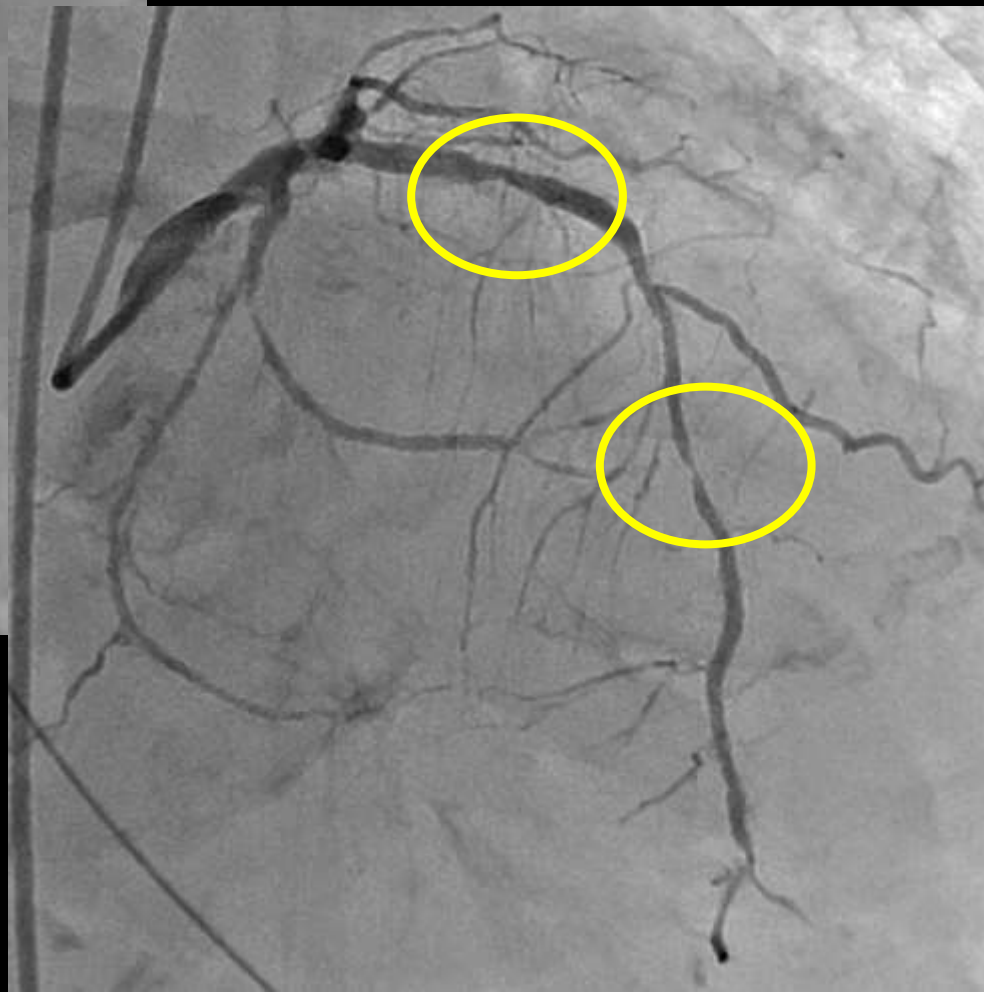
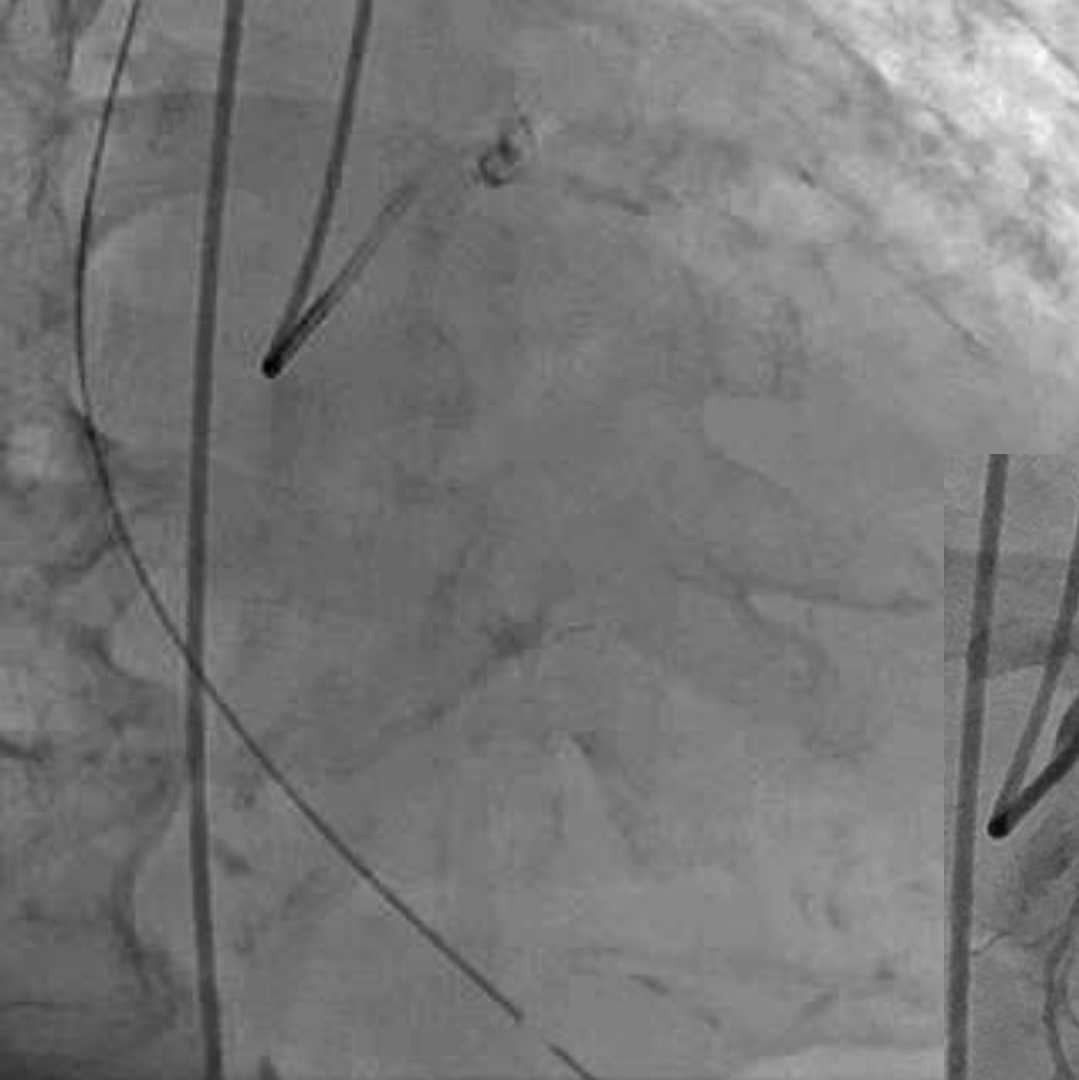
- Initial vital sign at KMTTH ER  
BP: 102/72mmHg, PR: 100/min, RR: 26/min,  
BT: 35.6°C, SpO<sub>2</sub>: 81%
- Aspirin (100mg) 3#, Ticagrelor (90mg) 2#, Heparin 5000U,
- Intubation with a ventilator support
- BP dropped to 78/50mmHg, then Dopamin pump used.
- Transfer to KMUH.
- In KMUH, BP 89/57mmHg even with Dopamine pump, then Norepinephrine pump used.
- NSTEMI with Cardiogenic shock, emergency coronary angiography was performed immediately.

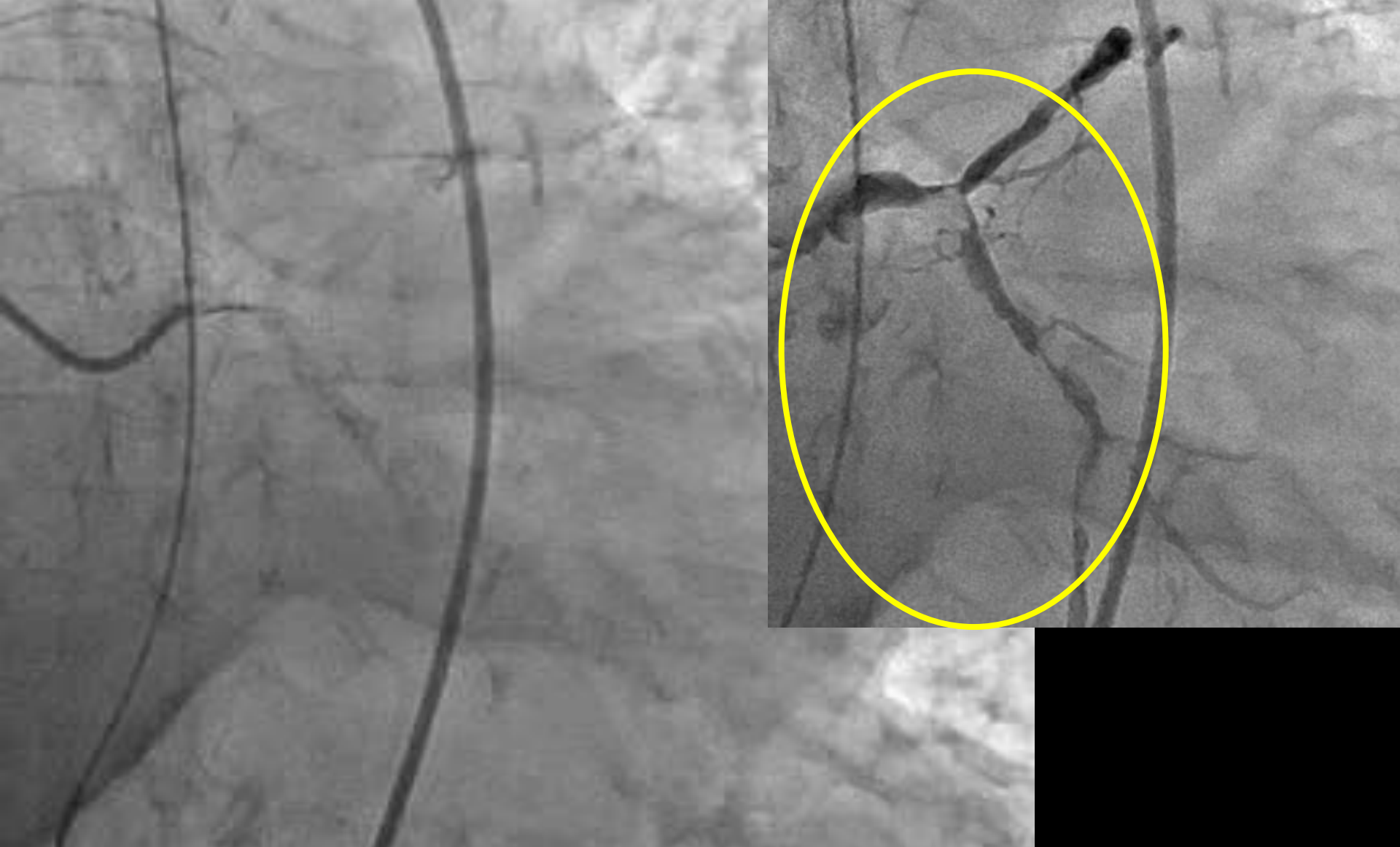


# LCA Angiogram









**Left main: Distal 80% stenosis**

**LAD: Orifice 70% stenosis, proximal 70% stenosis, middle 99% stenosis**

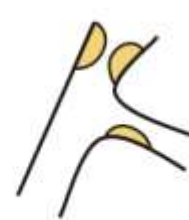
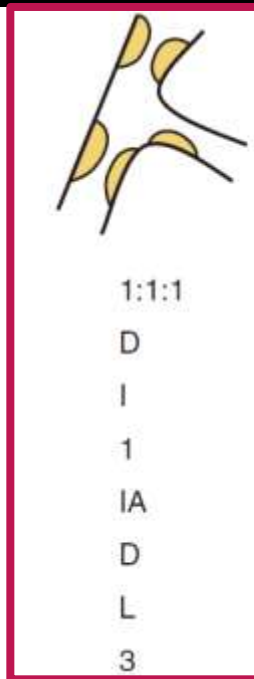
**LCX: Orifice 90% stenosis, middle to distal seg with diffuse 80-90% stenosis**

# RCA Angiogram



**RCA: Proximal chronic total occlusion with calcification, collaterals from LCA**





|                     |       |       |            |       |       |            |         |
|---------------------|-------|-------|------------|-------|-------|------------|---------|
| <b>Medina</b>       | 1:0:0 | 0:1:0 | 1:1:0      | 1:1:1 | 0:0:1 | 1:0:1      | 0:1:1   |
| <b>Duke</b>         | A     | B     | C          | D     | E     | F          | No Duke |
| <b>Sanborn</b>      | IV    | II    | No Sanborn | I     | IV    | No Sanborn | III     |
| <b>Lefevre</b>      | 3     | 4a    | 2          | 1     | 4b    | No Lefevre | 4       |
| <b>Safian</b>       | IIB   | IIIB  | IB         | IA    | IV    | IIA        | IIIA    |
| <b>Syntax</b>       | A     | B     | C          | D     | E     | F          | G       |
| <b>Movahed</b>      | 1s    | V     | S          | L     | T     | 2          | 1m      |
| <b>Staico-Feres</b> | 1A    | 1B    | 2A         | 3     | 1C    | 2B         | 2C      |



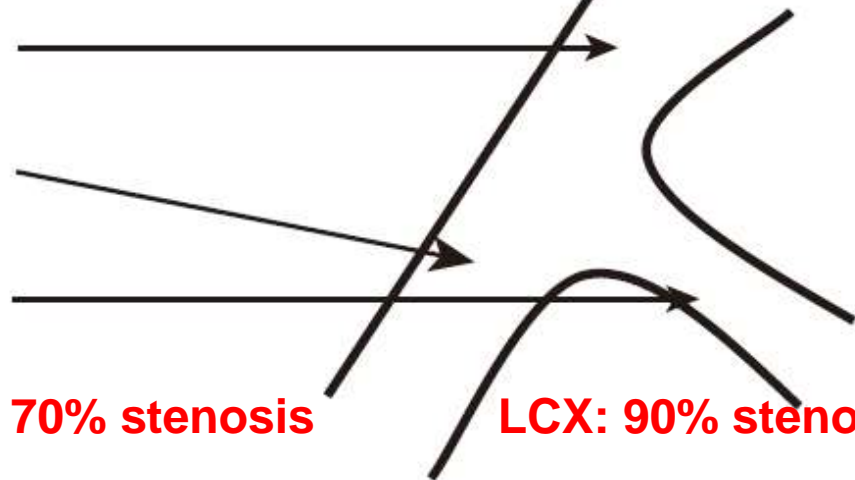
**Medina**

**Left main: 80% stenosis**

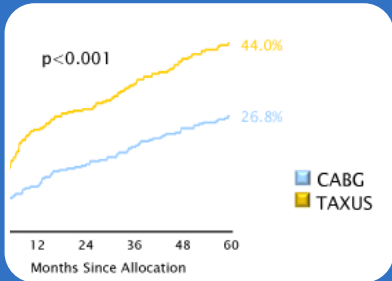
0 or 1  
0 or 1  
0 or 1

**LAD: 70% stenosis**

**LCX: 90% stenosis**



# Strategies in NSTEMI (LMT+3VD) with Cardiogenic Shock



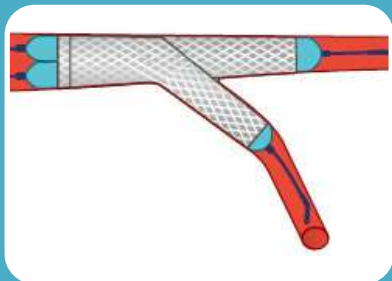
## Assessment (CABG versus PCI)

- Syntax Score: 79
- New EuroSCORE II(2011): 31.06%
- Bifurcation: Medina 1:1:1



## Prepare

- Surgical consultation and backup suggested, refused by family
- IABP support (even ECMO could be supported by CVS)
- Inform his family about poor prognosis



## PCI Strategy

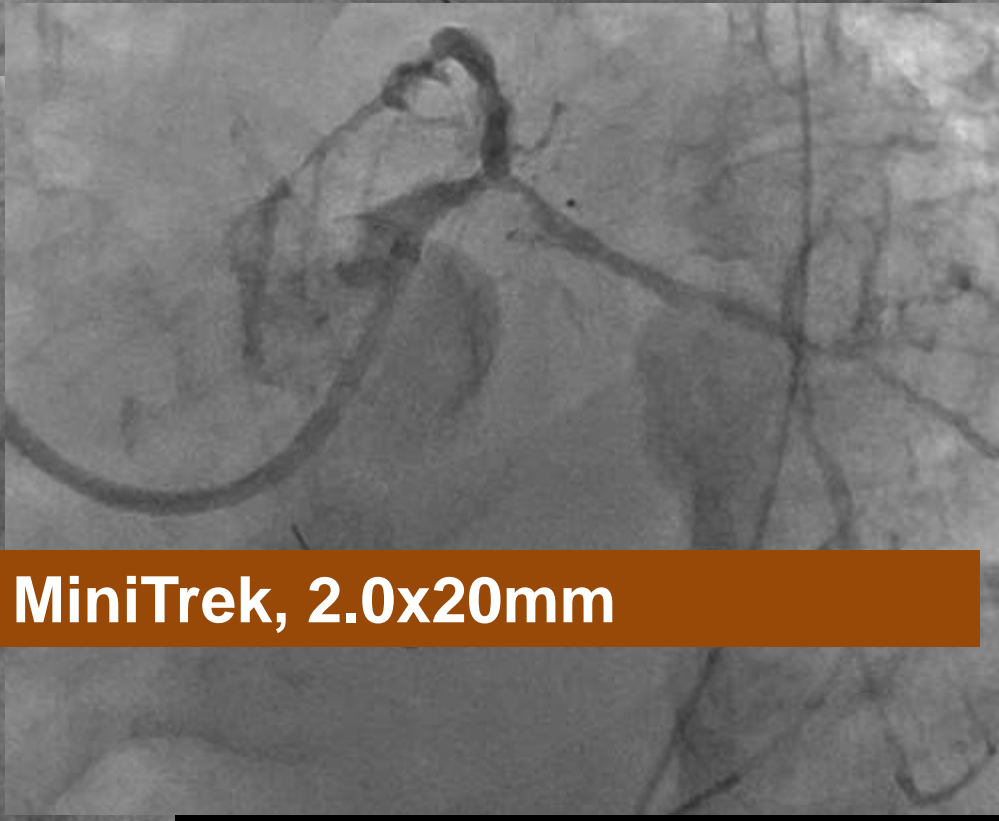
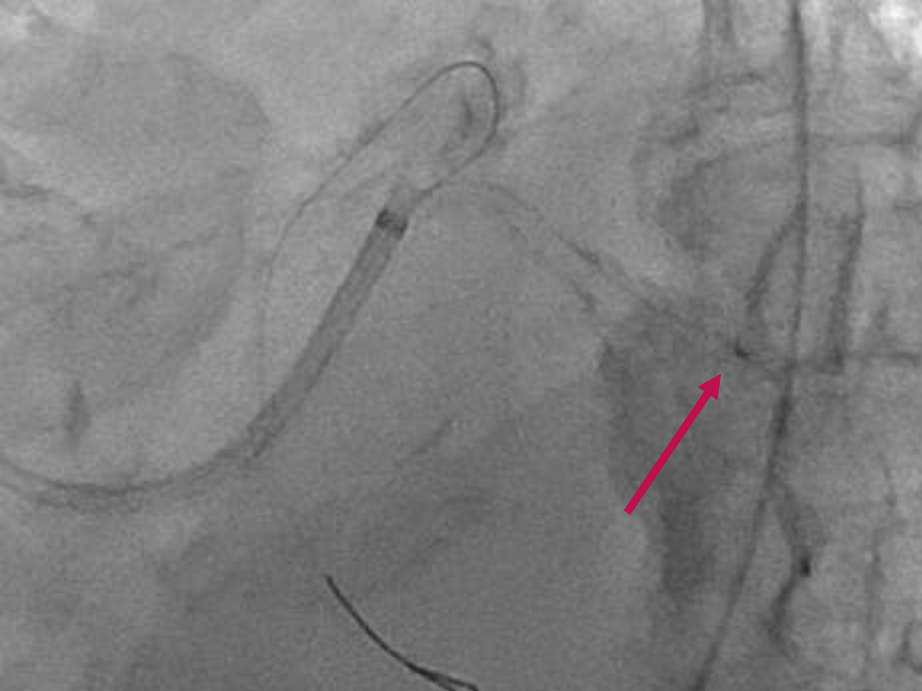
- Stage PCI for LCA first, Cullotte preferred
- Do our best !

# PCI for LCX first

Under an **IABP** support, Medtronic **EBU 3.5 7Fr** with side hole, Terumo Runthrough Floppy to distal LAD , Runthrough Hypercoat to distal LCX

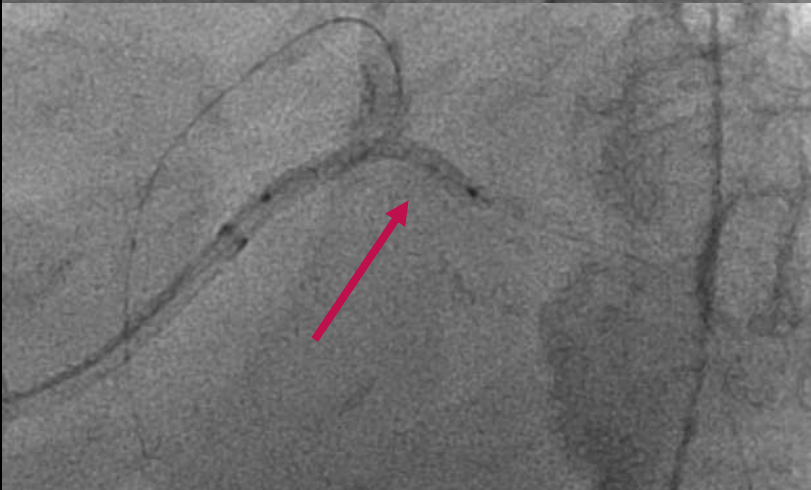
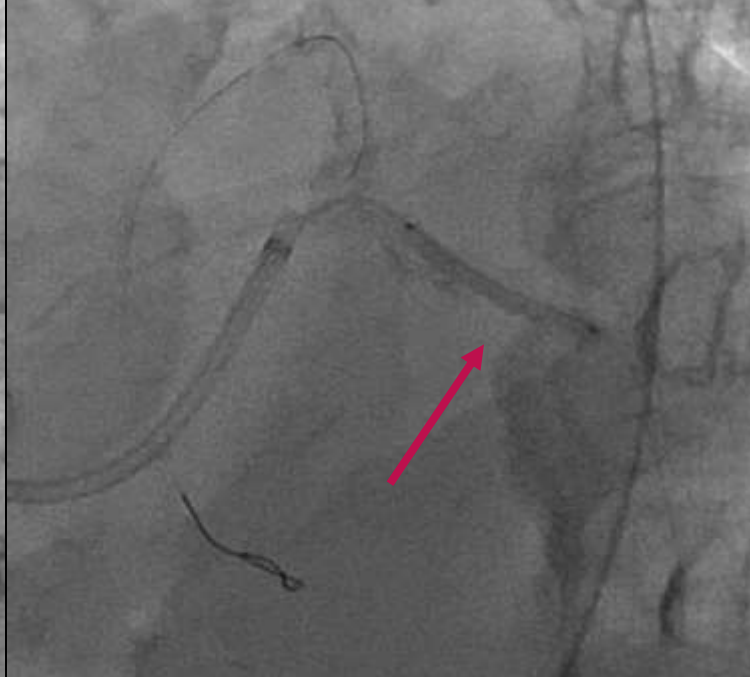


**Difficult to advance aspiration catheter (Medtronic Advance Export), stuck in proximal LCX**



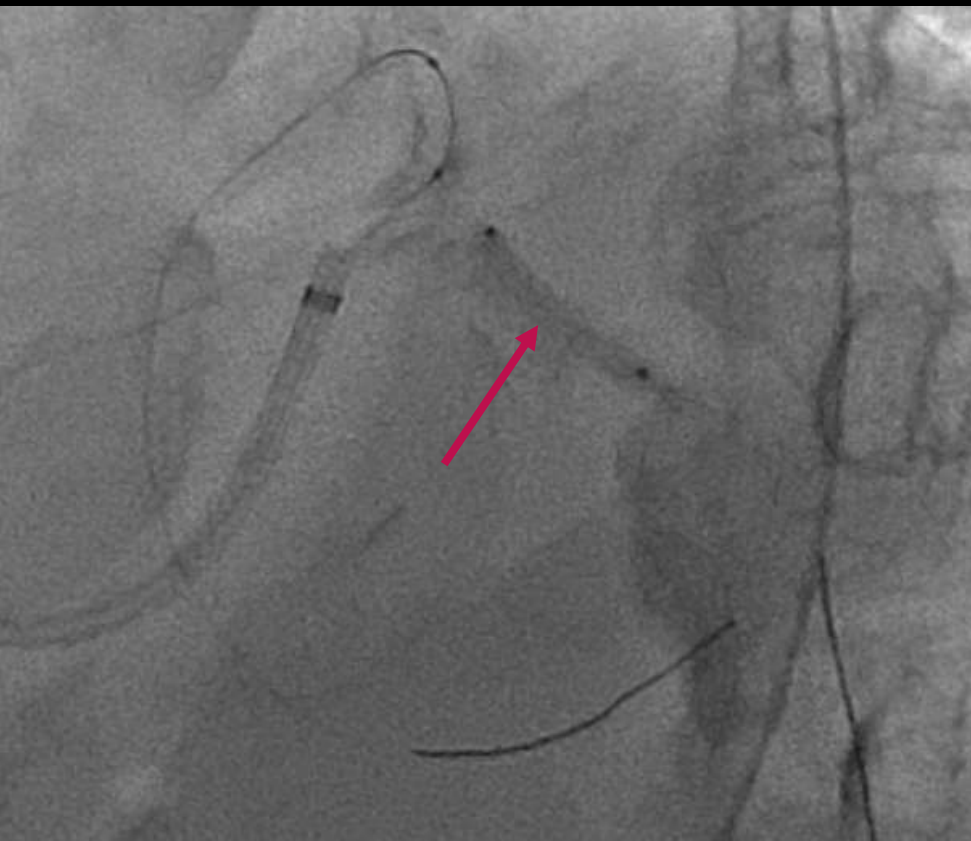
**POBA with Abbott MiniTrek, 2.0x20mm**



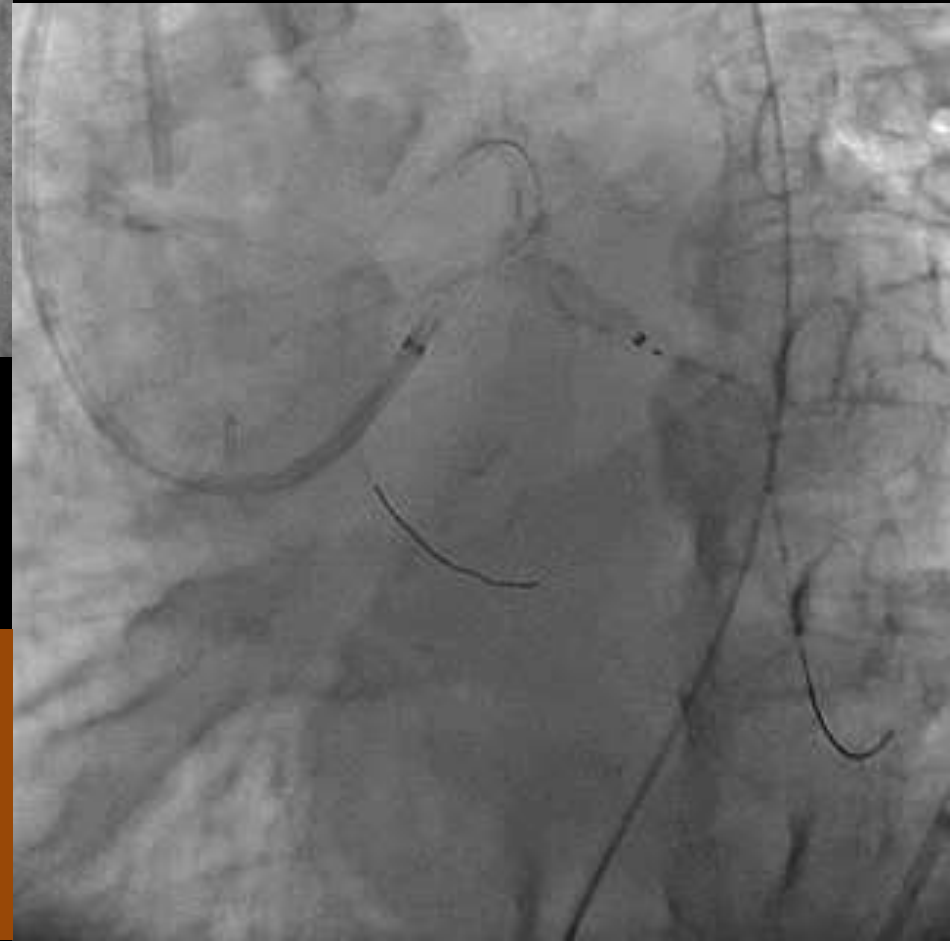


**Sequential POBA with Medtronic NC Euphora, 2.5x20mm**



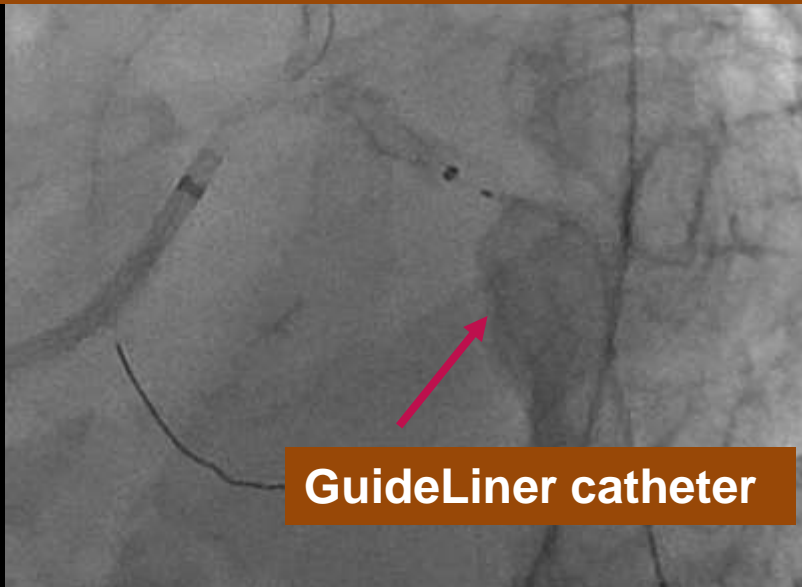


**Difficult to advance 1<sup>st</sup> DES even with an anchor balloon in LAD. POBA with Medtronic NC Euphora, 3.0x15mm in proximal LCX for better lesion preparation**

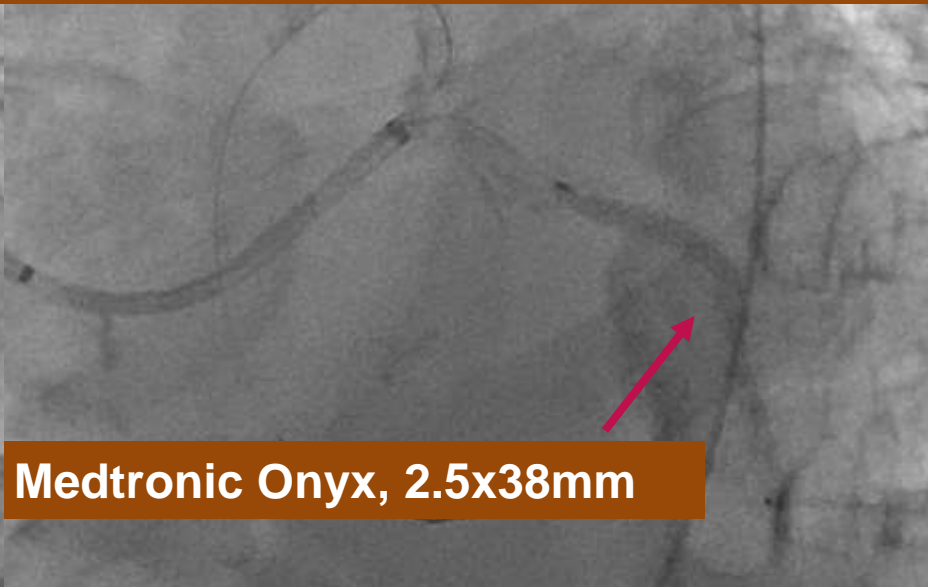


**Difficult to advance GuideLiner, then use anchor balloon with Medtronic NC Euphora 2.5x20mm in LCX to advance the GuideLiner catheter  
Deliver 1<sup>st</sup> DES to middle LCX**

**Under a GuideLiner catheter, 1<sup>st</sup> DES: Medtronic Onyx, 2.5x38mm at middle LCX**



**GuideLiner catheter**



**Medtronic Onyx, 2.5x38mm**

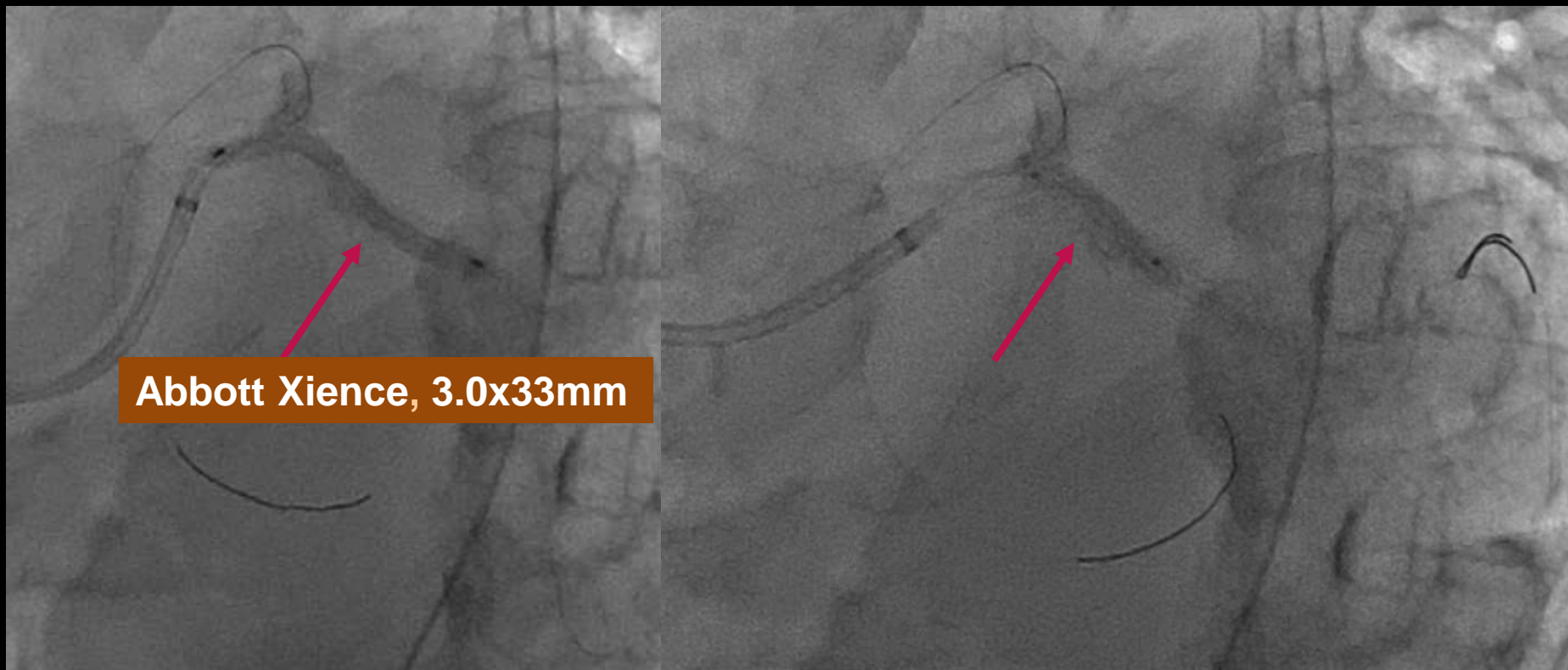


**Post-dilate with Medtronic NC Euphora, 3.0x15mm**



# After 1<sup>st</sup> DES in middle LCX





**Abbott Xience, 3.0x33mm**

**[First part of Culotte technique]**

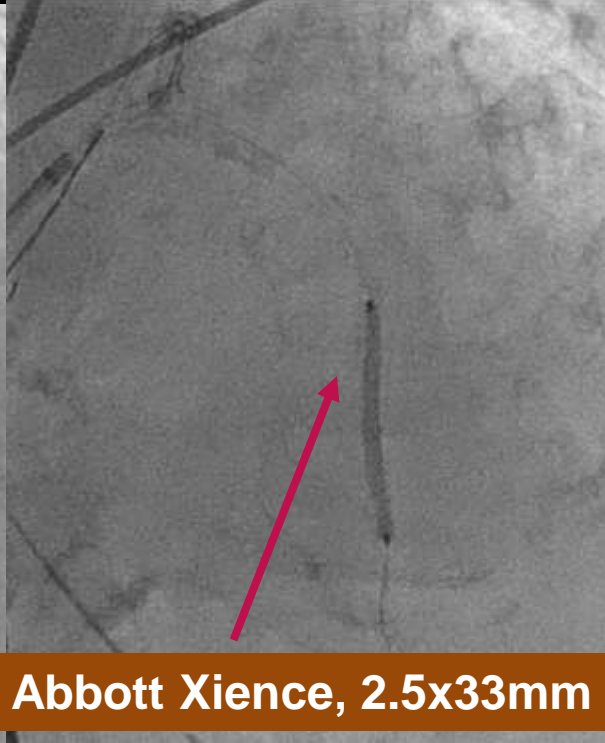
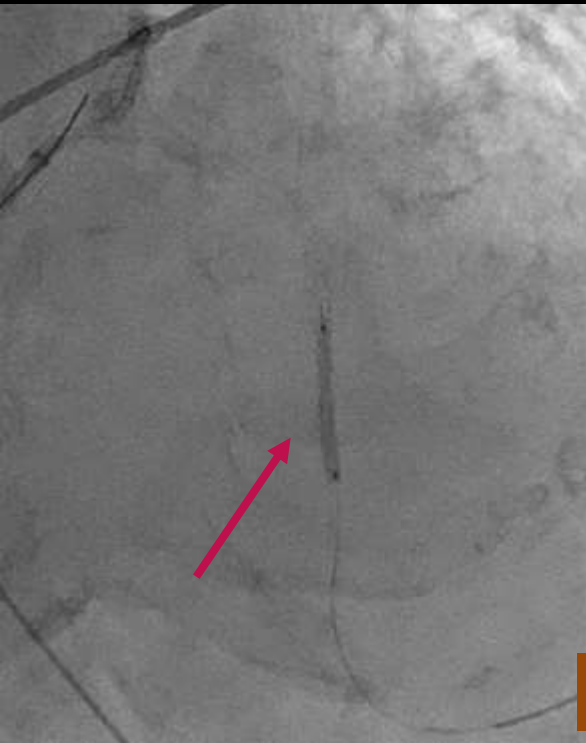
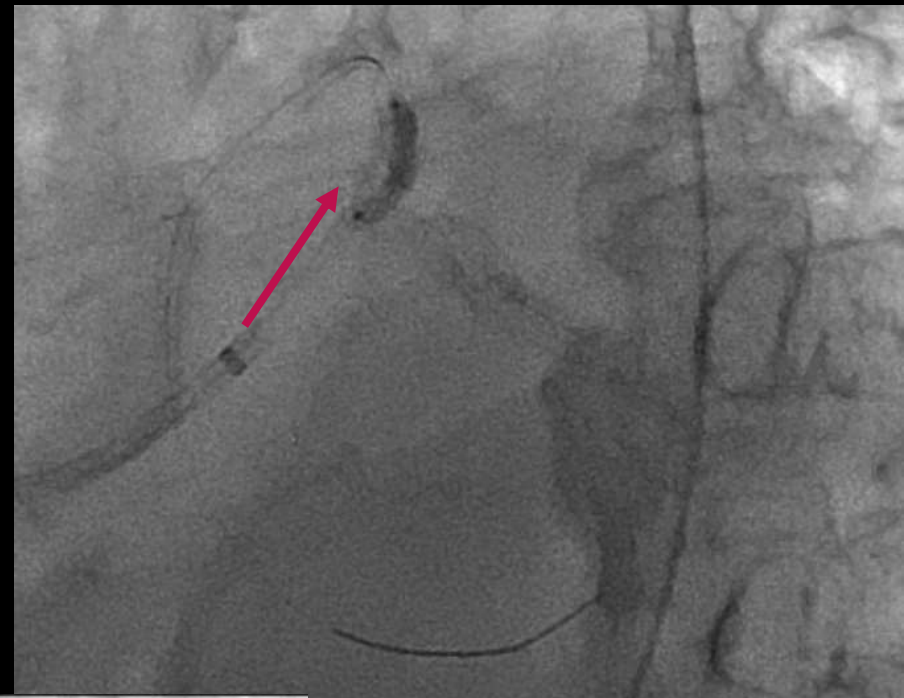
**2<sup>nd</sup> DES: Abbott Xience, 3.0x33mm at LM-LCX**

**Post-dilate with Medtronic NC Euphora, 3.0x15mm**

**Wire crossed(Floppy to LCX and Hypercoat to LAD)**



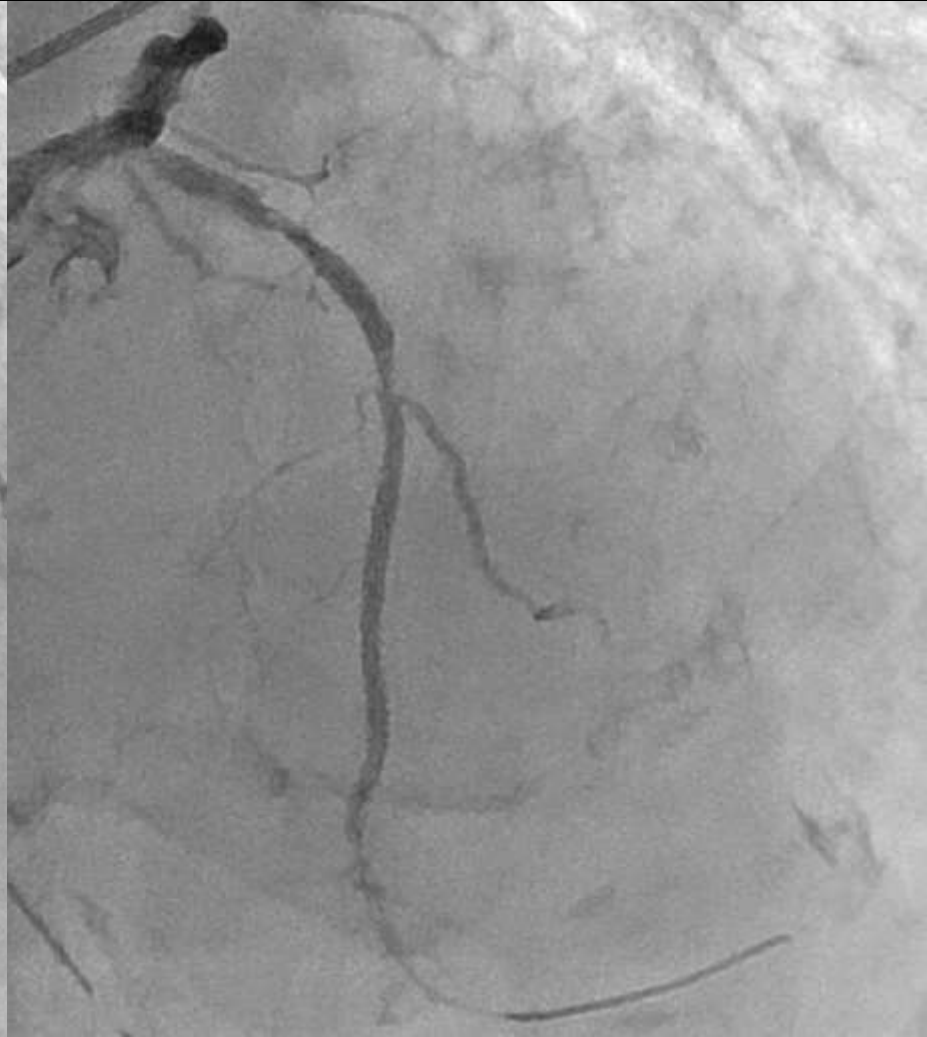
- Pre-dilate with Medtronic NC Euphora, 2.5x20mm at proximal and middle LAD
- 3<sup>rd</sup> DES: Abbott Xience, 2.5x33mm at middle LAD
- Post-dilate with Medtronic NC Euphora, 2.5x20mm

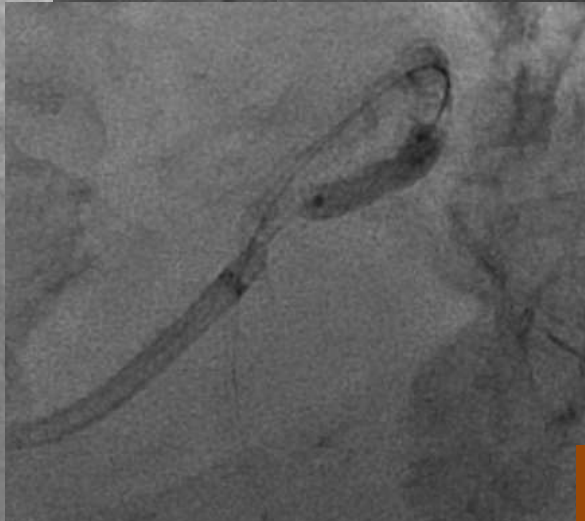
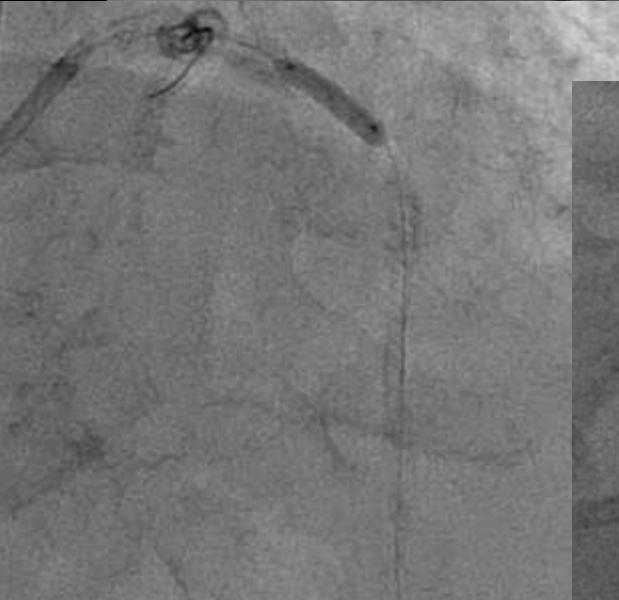


**Abbott Xience, 2.5x33mm**



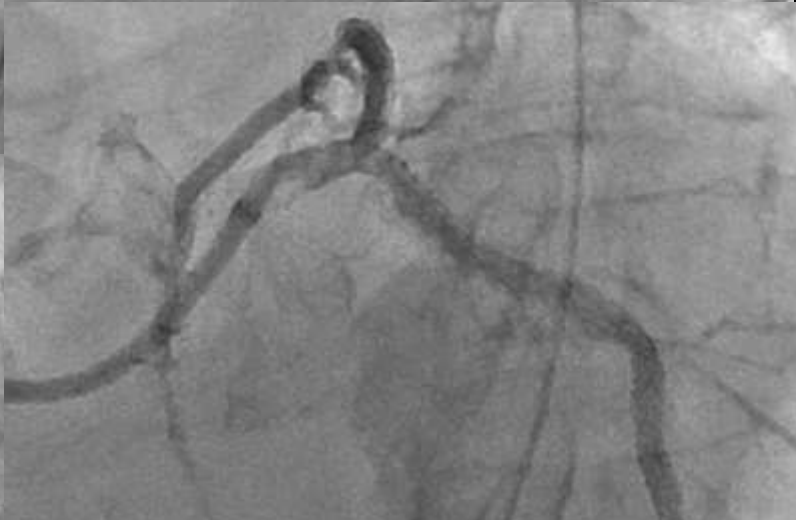
# Middle LAD: before and after stenting





Abbott Xience, 3.0x38mm

**4<sup>th</sup> DES: Abbott Xience, 3.0x38mm at LM-LAD**  
**Post-dilate with Medtronic NC Euphora, 3.0x15mm**



**[Second part of Culotte technique]**  
**Wires Re-crossed**  
**KBT: Medtronic NC Euphora, 3.0x15mm x2(LM-LAD/LM-LCX)**  
**POT: Medtronic NC Euphora, 4.0x15mm**

# Final angiography of LAD



**1<sup>st</sup> DES : Medtronic Onyx, 2.5x38mm, at middle LCX**

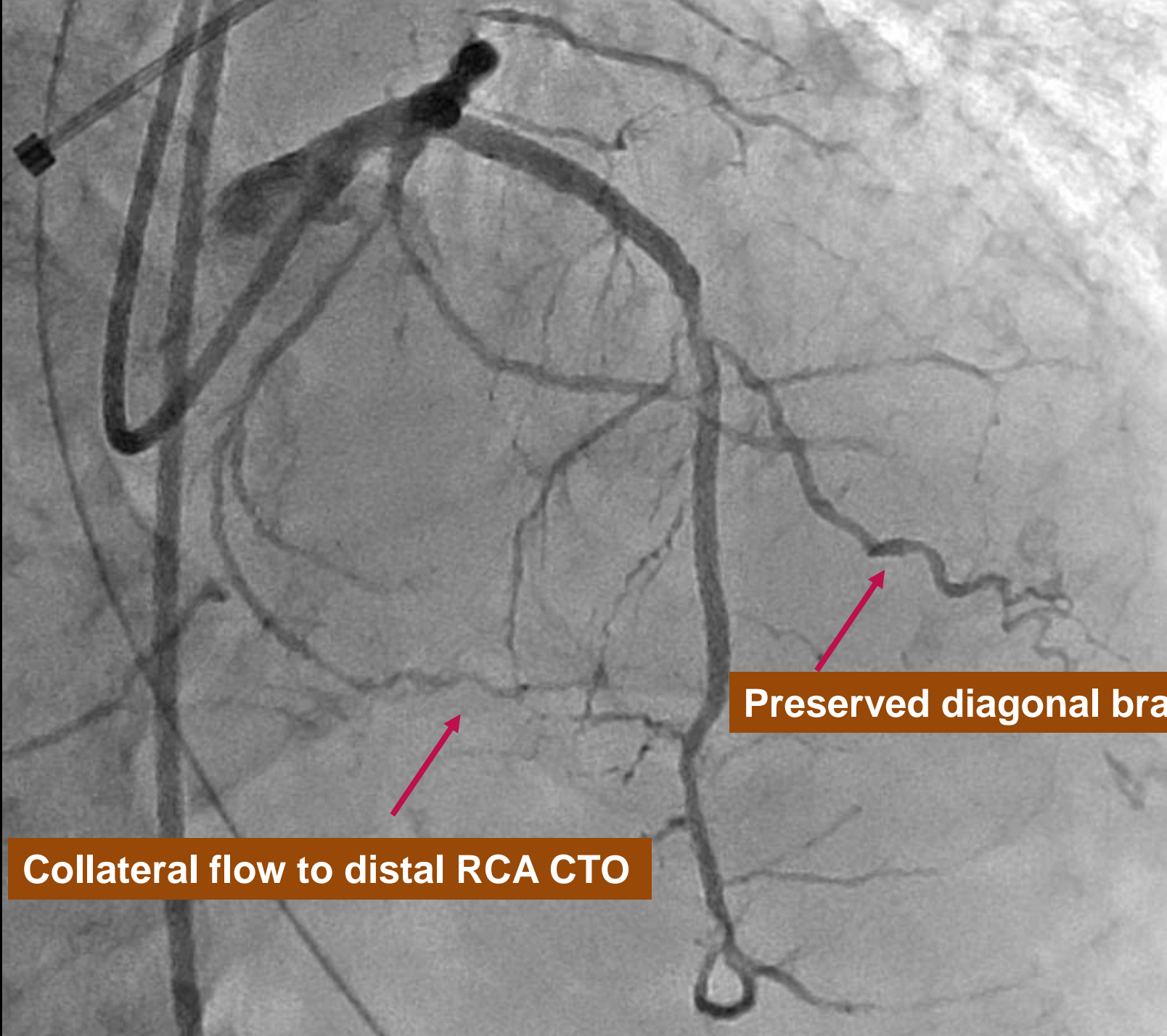
**2<sup>nd</sup> DES : Abbott Xience, 3.0x33mm, at LM-LCX**

**3<sup>rd</sup> DES : Abbott Xience, 2.5x33mm, at middle LAD**

**4<sup>th</sup> DES : Abbott Xience, 3.0x38mm, at LM-LAD**

**LMT-Bifurcation with Culotte technique. Time in Cath Lab : 2hr 30min**





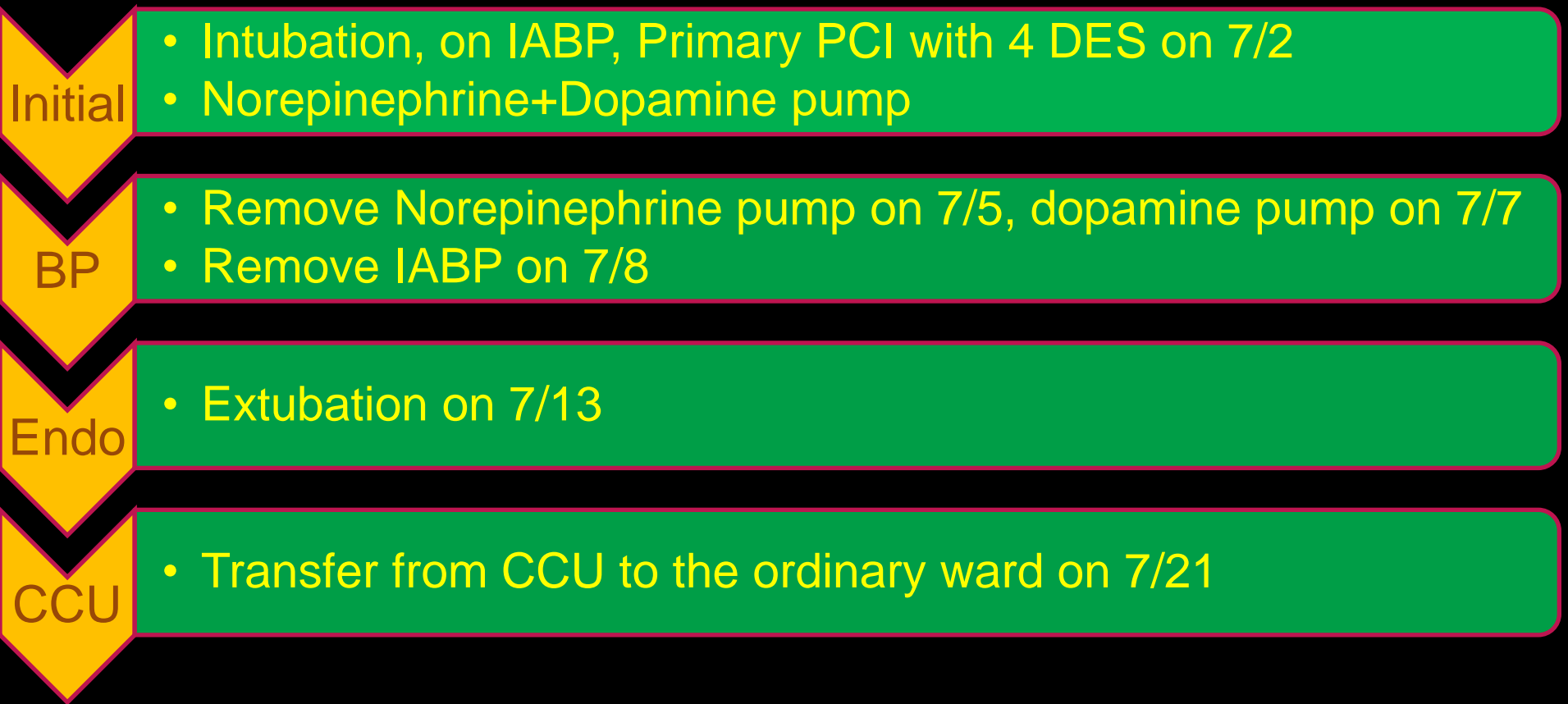
**Collateral flow to distal RCA CTO**

**Preserved diagonal branch**



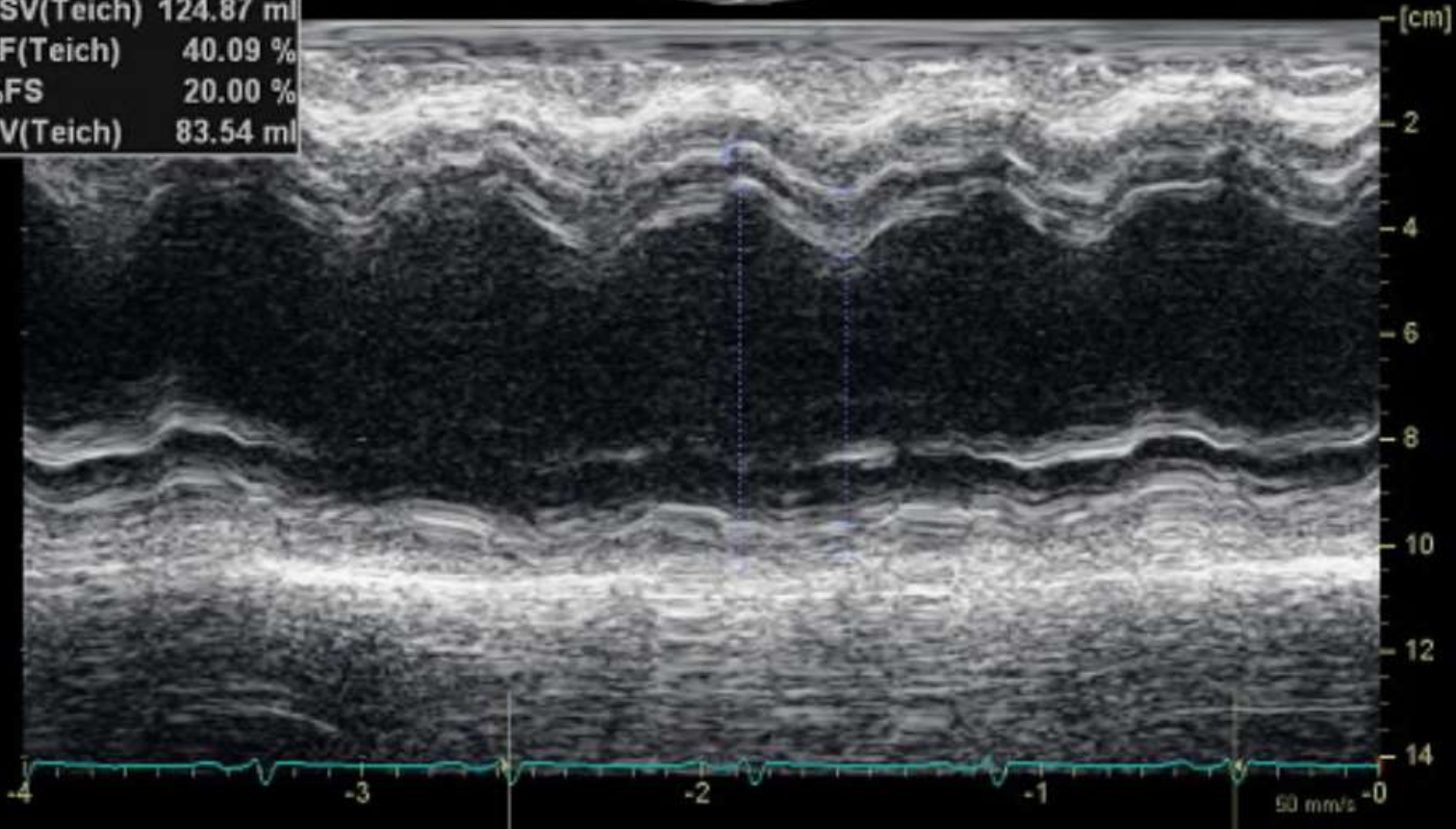
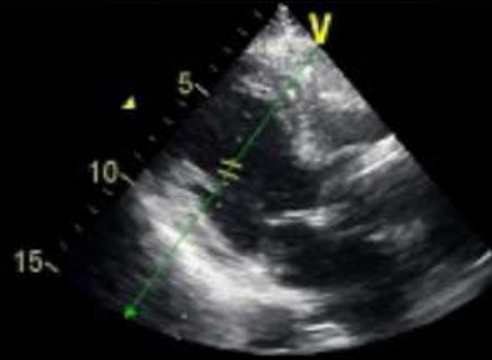
# After Complex PCI

|                   | 7/3 4:07 | 7/3 11:24 | 7/3 17:57 | 7/4 3:31 |
|-------------------|----------|-----------|-----------|----------|
| CPK(IU/L)         | 2647     | 2231      | 1395      | 1020     |
| CK-MB(ng/ml)      | 249.4    | 242.1     | 105.3     | 47.8     |
| Troponin-I(ng/ml) | >80      | >80       | >80       | >80      |



# Echocardiography after PCI for 22 days

|   |            |           |
|---|------------|-----------|
| 1 | IVSd       | 0.80 cm   |
|   | LVIDd      | 6.40 cm   |
|   | LVPWd      | 0.74 cm   |
|   | IVSs       | 1.25 cm   |
|   | LVIDs      | 5.12 cm   |
|   | LVPWs      | 0.60 cm   |
|   | EDV(Teich) | 208.41 ml |
|   | ESV(Teich) | 124.87 ml |
|   | EF(Teich)  | 40.09 %   |
|   | %FS        | 20.00 %   |
|   | SV(Teich)  | 83.54 ml  |



# Contrast induced acute kidney (CI-AKI) risk score

| Risk factors                | Integer score     |
|-----------------------------|-------------------|
| Hypotension                 | 5                 |
| IABP                        | 5                 |
| Heart failure               | 5                 |
| Age >75 years               | 4                 |
| Anemia                      | 3                 |
| Diabetes                    | 3                 |
| Contrast media volume       | 1 for each 100 mL |
| Serum creatinine >1.5 mg/dL | 4                 |

**260ml**

Calculate

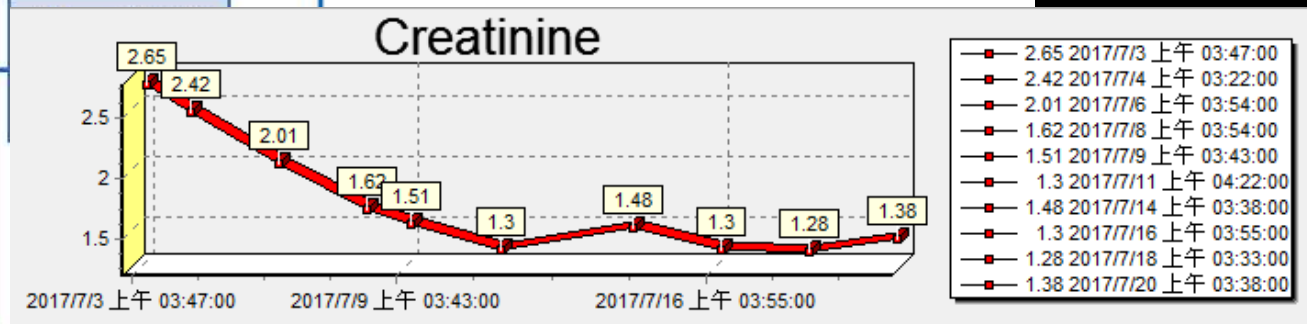
**CI-AKI risk score: 28**

| Risk score | Risk of CI-AKI | Risk of dialysis |
|------------|----------------|------------------|
| ≤5         | 7.5%           | 0.04%            |
| 6 to 10    | 14.0%          | 0.12%            |
| 11 to 16   | 26.1%          | 1.09%            |
| ≥16        | 57.3%          | 12.6%            |

OR

eGFR <60 mL/min/1.73 m<sup>2</sup>

eGFR ( mL/min/1.73 m<sup>2</sup>) =  
 $186 \times (SCr)^{-1.154} \times (Age)^{-0.203}$   
 $\times (0.742 \text{ if female}) \times (1.210 \text{ if black})$



# Take Home Message

- Heart Team evaluation is important to provide all possible individualized revascularization, and percutaneous coronary intervention could improve coronary flow more quickly.
- One or two-stent technique is still an issue in **LMT-bifurcation** lesion, and Emergent PCI involving left main artery (2-10%) is still challengeable under **unstable hemodynamics**.
- Size of side branch, lesion length in side branch, bifurcation angulation and calcification severity/extent should all be taken into consideration carefully **before intervention**





高雄醫學大學附設中和紀念醫院  
Kaohsiung Medical University Chung-Ho Memorial Hospital

# Thank You for Listening



承先啟後一甲子·再創輝煌百年史