

How MCS Save Lives!

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Hong Kong

Case

- 58/M
- PMH: Schizophrenia
- Found lying on the floor, with confusion and incontinence
- Denied chest pain

**HOSPITAL AUTHORITY
New Territories West Cluster**

**DEPARTMENT OF
ACCIDENT & EMERGENCY**

**Cardio-pulmonary
Resuscitation
Chart**

Time of Death	Cardiac Arrest	BCLS	ACLS	Admission	Certified dead
	:	:	:	:	:

Pre-hospital Mx by: Ambulance Other Hospital:

Defibrillator () shock Airway: Oral Nasal LMA Combitube

IV Fluid () ml ETT: size () incisor level () cm

Neck Collar Other:

Drug Allergy: [Redacted] BW: 96.7 kg BH: cm Dx:

Time	Pulse /min	BP mmHg	GCS			Resp /min	SpO ₂ %	ETCO ₂ mmHg	CO	SVR	Prescription by doctor		Administration							
			E	V	M						Line	IV Fluid / Drug, Vol. / Dose, Rate / Route	Dr.	Start	Given by	Check by	Vol. infused			
11:47	SR 76	100/70	1	3	5	18	90	RA			① HB Suct									
11:52	SR 80	100/70	3	4	5	18	88	RA			② HB Suct									
11:57	SR 83	100/70	3	4	6	18	98	RA												
12:02	SR 80	108/97	3	4	6	18	99	2L O ₂												
12:07	SR 83	108/97	3	4	6	18	99	2L O ₂												
12:12	SR 84	92/77	3	4	6	18	97	v												
12:17	SR 93	108/89	3	4	6	18	97	v												
12:22	SR 94	105/90	3	4	6	18	97	v												
12:25	SR 90	131/104	3	4	6	18	97	v												
12:30	SR 85	111/41	3	4	6	18	97	v												
12:35	SR 89	76/53	3	4	6	18	97	v			① NS 250ml FR IV		12:42							
12:40	SR 87	92/64	3	4	6	18	97	v			② NS 250ml FR IV		12:55							
12:45	SR 88	87/37	3	4	6	18	96	v												
12:50	SR 77	63/44	3	4	6	18	91	v			① Dopamine 100mg with IV		12:58							
12:55	SR 90	100/70	3	4	6	18	88	v			47.5 ml NS @ 6ml/hr									

Temp 36.5°C
H₂O₂ = 12.1
Hb = 11.3
Blood x
CR. LRT.
RG clothing?
CTB
ECG
Cath a/c @ 12:30
 urine x ABON
Axr. CXR
ZCC (post) @ 12:47
PPT @ 12:47
call arrived @ 12:57
clo ICU @ 12:58

ID: 1719

For Scan M5175 52462

15-11-2021 12:43:48

HR : 92 bpm
 P : 114 ms
 PR : 198 ms
 QRS : 134 ms
 QT/QTc : 396/477 ms
 P/QRS/T : 54/94/134 °
 RV5/SV1 : 0.688/0.362 mV

Diagnosis Information:

Atrial fibrillation with frequent PVCs or aberrant ventricular conduction

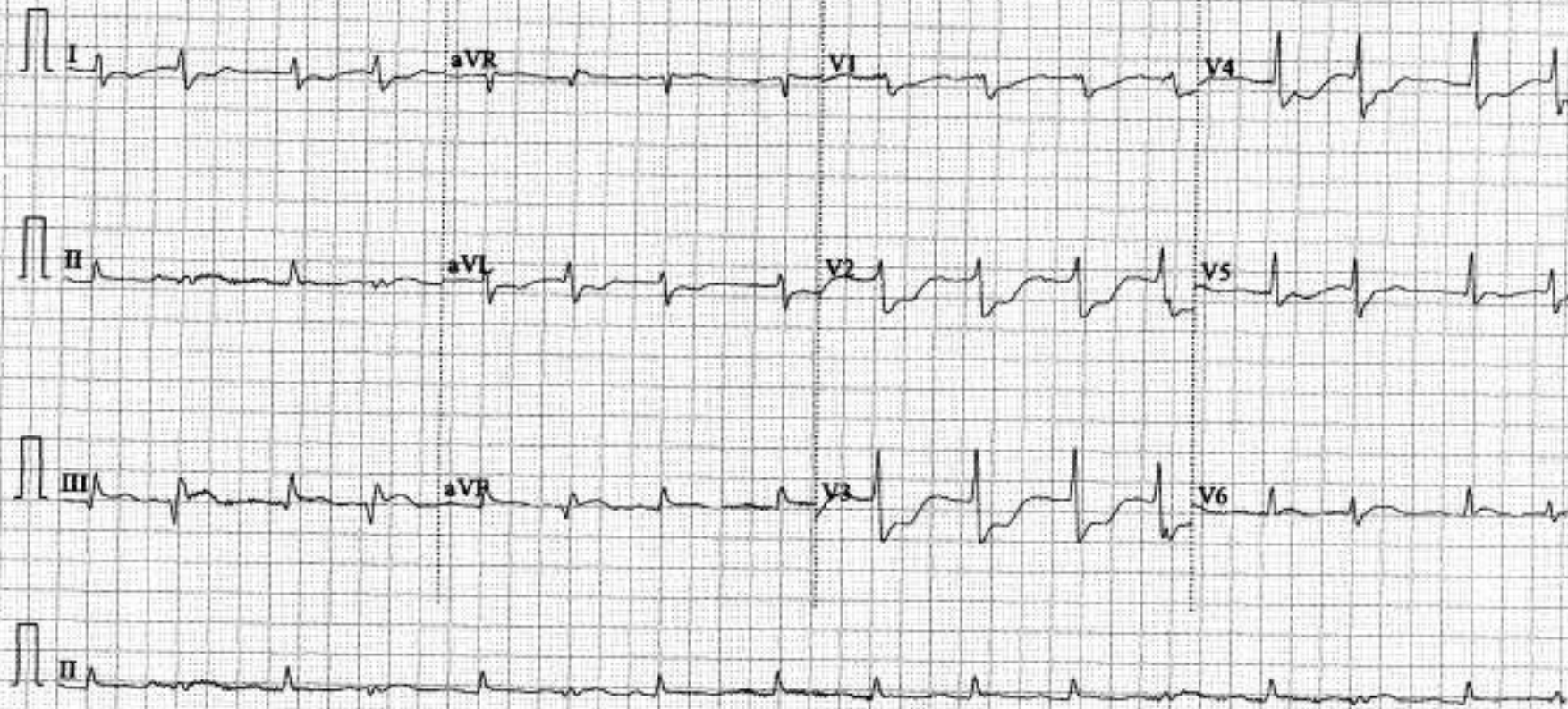
Rightward axis

Right bundle branch block

Lateral ST-T abnormality may be due to myocardial ischemia

Abnormal ECG

Report Confirmed by:



ID: 1719

For ECG 5019-1-1462

15-11-2021 12:47:55

HR : 93 bpm

P : 68 ms

PR : 168 ms

QRS : 124 ms

QT/QTc : 362/451 ms

P/QRS/T : 29/77/118 °

RV5/SVI : 0.000/0.210 mV

Male Years

Diagnosis Information:

*** CONSIDER ACUTE STEMI ***

Atrial fibrillation with PVC(s) or aberrant ventricular conduction

Lead(s) unsuitable for analysis: V4

IV conduction defect

Lateral ST elevation, CONSIDER ACUTE INFARCT

Marked anteroseptal ST depression accompanies the infarct

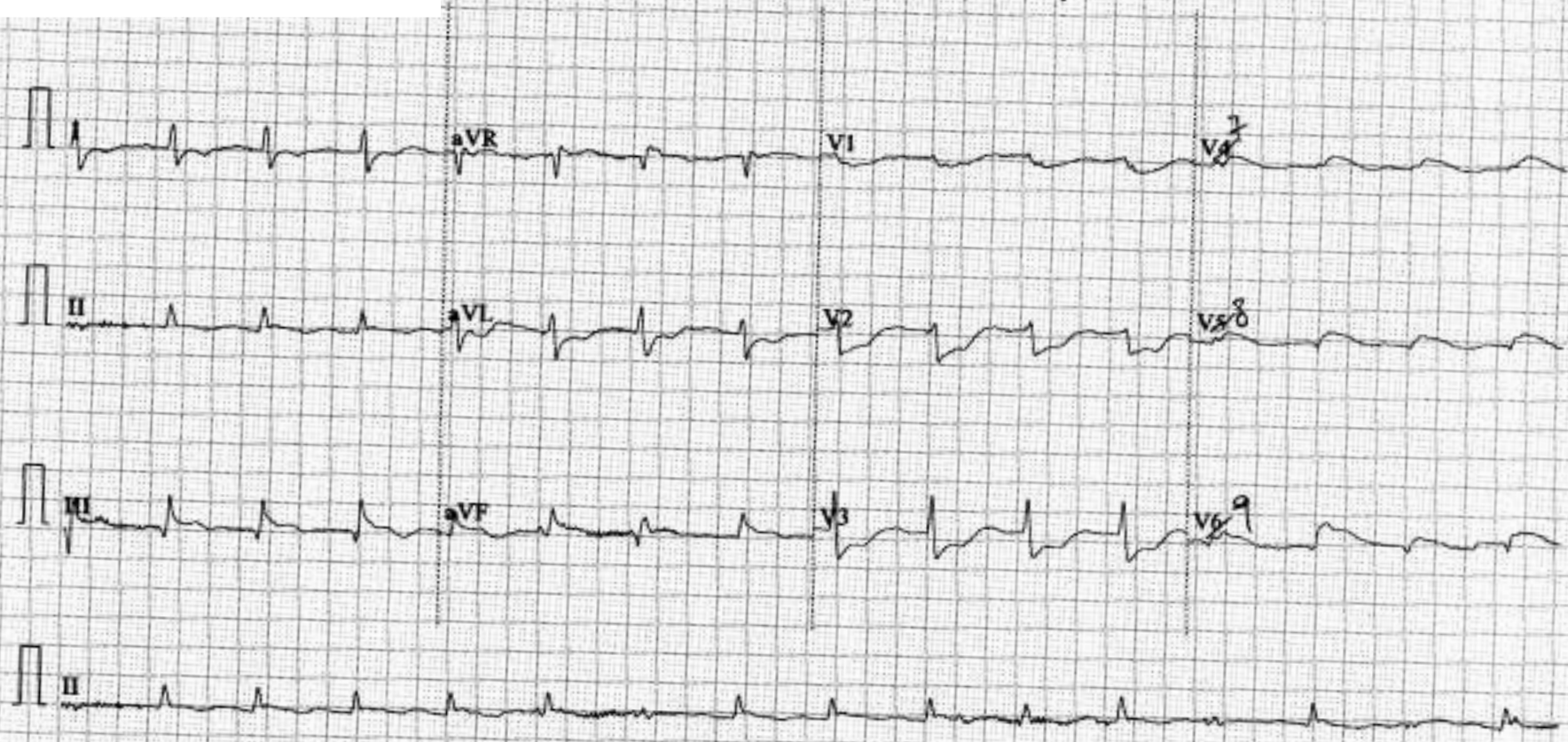
Abnormal ECG

Report Confirmed by:

P. Pearson

⓪

[Signature]



15/11		Pulse	BP	GCS			Resp	SpO ₂	ETCO ₂	CO	SVR	Prescription by doctor				Administration		
Time	Rhythm	/min	mmHg	E	V	M	/min	%	mmHg	CI	Joules	Line	IV Fluid / Drug, Vol. / Dose, Rate / Route	Dr.	Start	Given by	Check by	Vol. infused
13:00	SR	87	66/45	4	6	16	16	92	40	/		①	↑ Dopamine rate to 30ml/hr		1300	✓	✓	
13:05	SR	88	82/54	4	4	6	16	92	40	/		③	Adrenaline 1:10000 30ml with 20ml NS @ 2ml/hr IV.		1303	✓	✓	
13:10	SR	95	86/50	4	4	6	16	92	✓	/		③	HB Set					- BID x T&S sent @ 13:10
13:15	SR	98	<i>in progress</i>	4	4	6	18	96	✓	/		②	Warm NS 500ml FR IV		1310	✓	✓	
13:20	SR	98	<i>radial pulse</i>	1	1	1	20	97	✓	/		②	Zemidate 8mg IV		1350	✓	✓	
13:25	SR	114	97/42	1	1	1	20	96		/		②	Rocuronium IV 7mg		1300	✓	✓	
13:30	SR	125	<i>in progress</i>	1	T	1	ETT	99	49	/		②	Adrenaline 1:10000 10ml IV		1337	✓	✓	
13:35	SR	125	101/82	1	T	1	ET	90	45	/		②	Adrenaline 1:10000 10ml IV		1340	✓	✓	
13:36	PEA	125	101/82	1	T	1	ETT	<i>unobtainable</i>		/		③	Adrenaline drip rate to 10ml/hr		1341	✓	✓	
13:37	PEA	45	✓	1	T	1	ETT	<i>unobtainable</i>		/		②	Hartmann Solution 500ml IV FR		1342	✓	✓	
13:40	SR	87	✓	1	T	1	ETT	87	17	/								
13:45	SR	85	152/114	1	T	1	ETT	89	14	/								
13:48	SR	85	<i>in progress</i>	1	T	1	ETT	89	12	/								

Intubation
 @ 13:30 -
 ETT #7.5 -
 Masking 20cm -
 cuff pressure 130mmHg
 RITrocar @ 13:35 -
CPR start @ 13:36
 CPR stopped @ 13:40
 H&T @ 13:47
 ROSC @ 13:49
 ZCB
 Blood v. stat

18P

Inferoposterior STEMI

- In severe cardiogenic shock requiring double inotropes
- APO and was intubated
- Developed PEA arrest after intubation

How would you plan for the PCI?

- Is mechanical circulatory support needed?
 - YES DEFINITELY!
- What type of MCS?
 - IABP
 - Impella
 - ECMO
 - Combination of the above
- PCI or MCS first?

MCS Decision Algorithm

ANATOMY

- Last remaining coronary conduit
- Atherectomy required
- High anticipated ischemic burden/extensive revascularization planned
- Retrograde approach
 - Ischemic time

PATIENT COMORBIDITIES

- Chronic obstructive pulmonary disease
- Anemia
- Chronic renal impairment
- Diabetes mellitus
- Peripheral vascular disease
- Surgical Ineligibility

HEMODYNAMICS

- Moderate to severe valve disease
- Systemic blood pressure
- LVEF
- ACS or chronic stable ischemic heart disease
- LVEDP
- Cardiac index and cardiac power index

LVEF < 50%: EVALUATE ALGORITHM

LVEF < 40%: RECOMMEND RHC PRIOR TO PCI

- +2 Cardiac index < 2.0 L/min/m² or PA sat < 55%
- +1 Syntax score ≥ 22
- +1 Ejection fraction < 25%
- +1 Systolic BP < 100 mm Hg at baseline
- +1 ACS presentation
- +1 Planned revascularization > 2 territories
- +1 Likely prolonged ischemia
 - Retrograde chronic total occlusion
 - Atherectomy
- +1 Severe mitral regurgitation
- +1 Decompensated state
 - LVEDP > 20 mm Hg
 - Significant new orthopnea
- 1 High-risk vascular injury/significant bleeding
- 1 Hemoglobin < 8 g/dL

UNLIKELY TO NEED SUPPORT

0-2

CONSIDER SUPPORT

3

STRONGLY CONSIDER SUPPORT

≥4

“I know it when I see it, and someone else will know it when they see it, but what they see and what they know may or may not be what I see and what I know”

- Goldberg re: Jacobellis vs. Ohio



SCAI

Society for Cardiovascular
Angiography & Interventions

Bricker et al *J Am Heart Assoc* 2019
 Kearney et al *Cardiac Interv Today* 2019
 Ly et al *Can J Cardiol* 2019
 Vandenbriele et al *JACC Interv* 2019
 Truesdell et al *Cardiovasc Revasc Med* 2020

We plan for

- ECMO
- PCI
- Impella

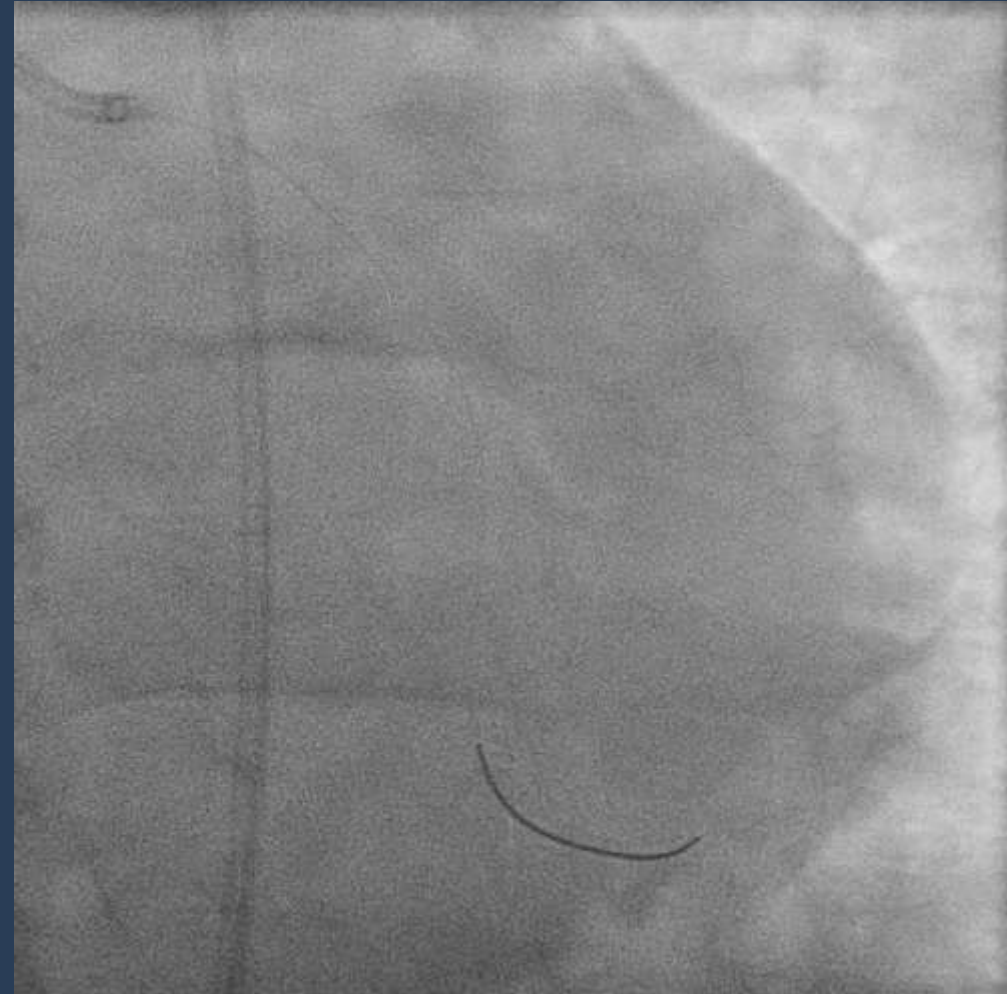
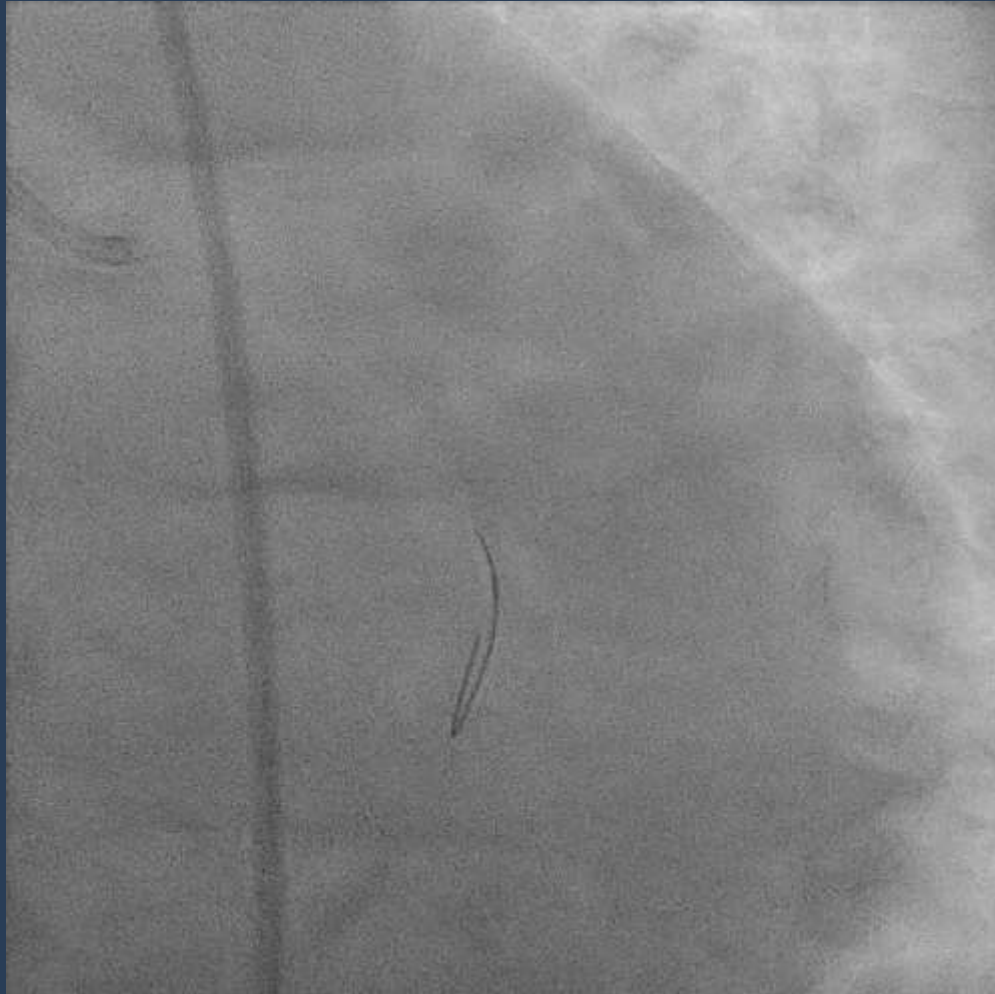
Procedure

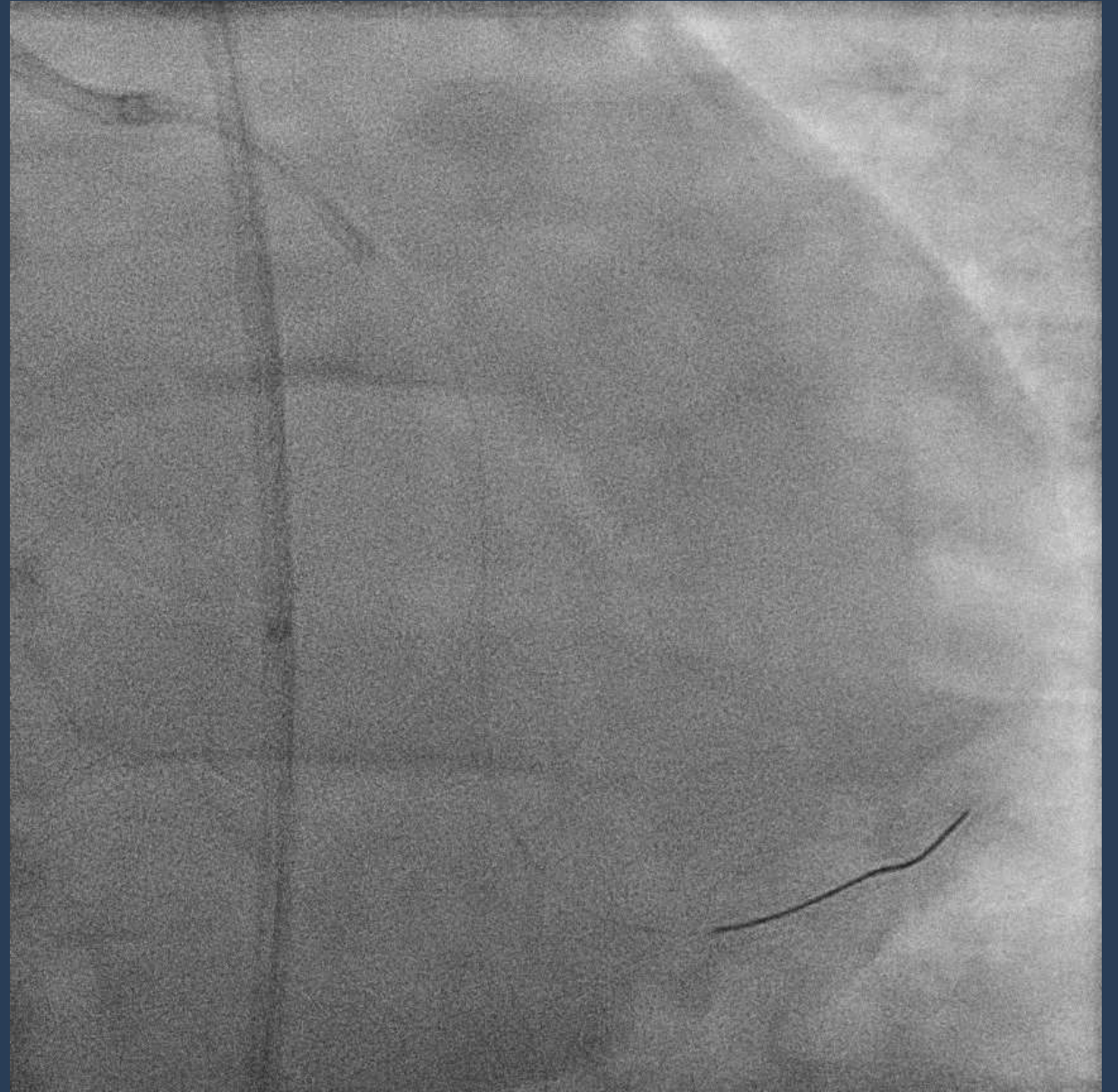
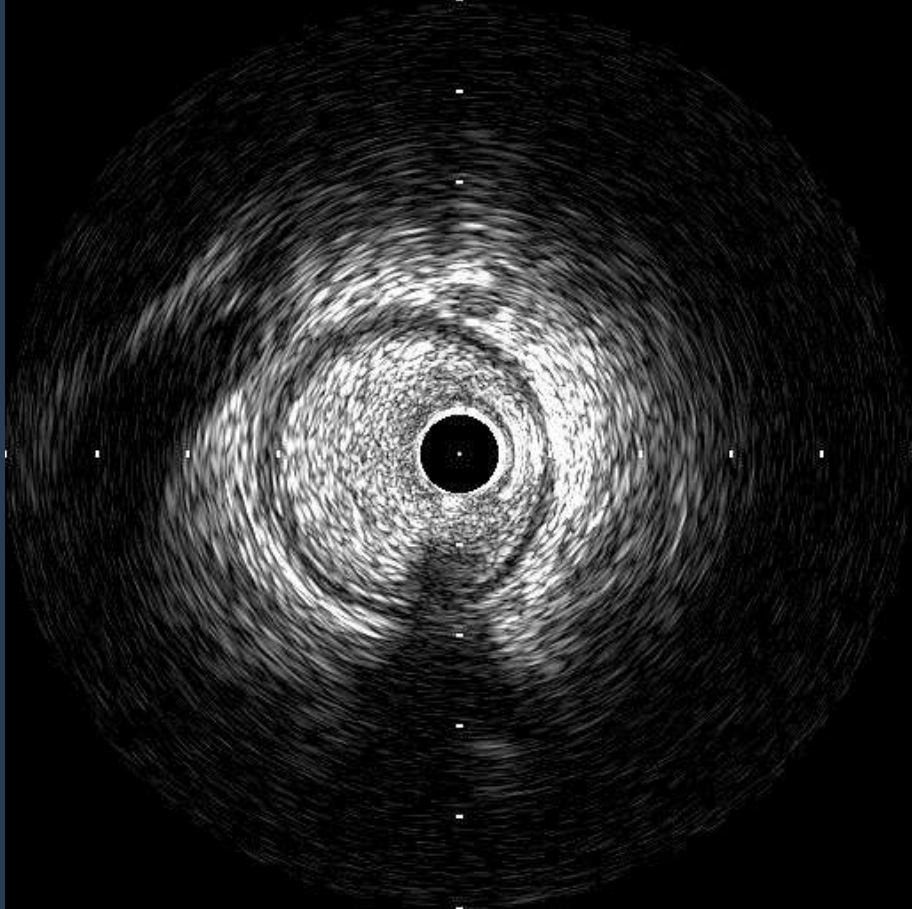
- RFA/ RFV punctured under USG guidance
- Developed PEA arrest again, CPR started
- ECMO inserted
- PCI under ECPR

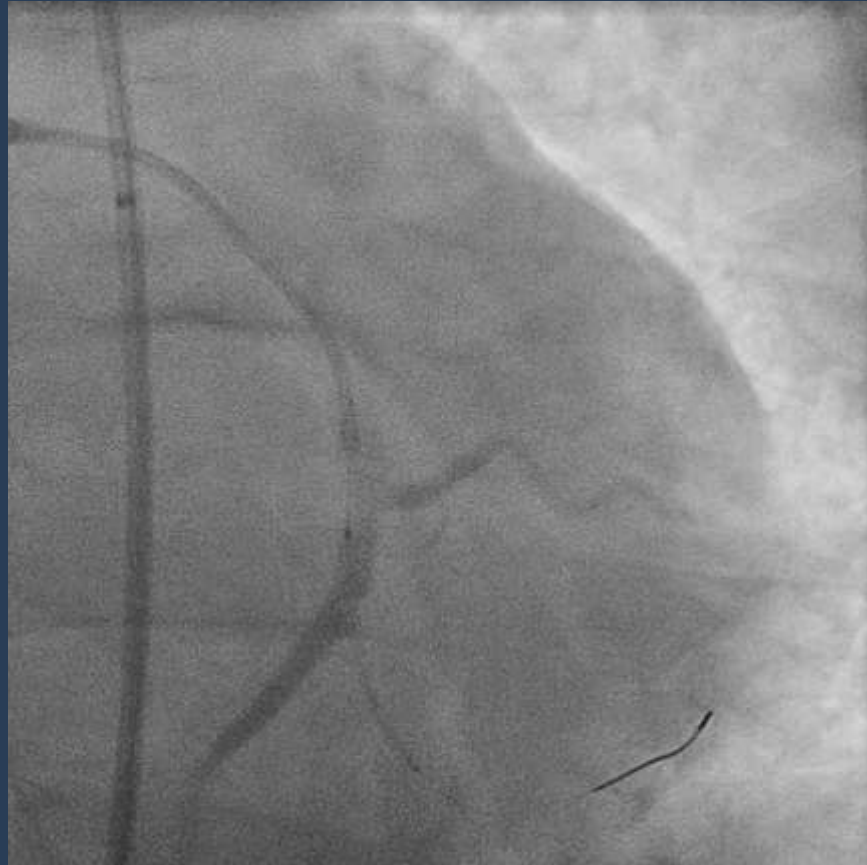
Coronary angiogram



PCI to LCx



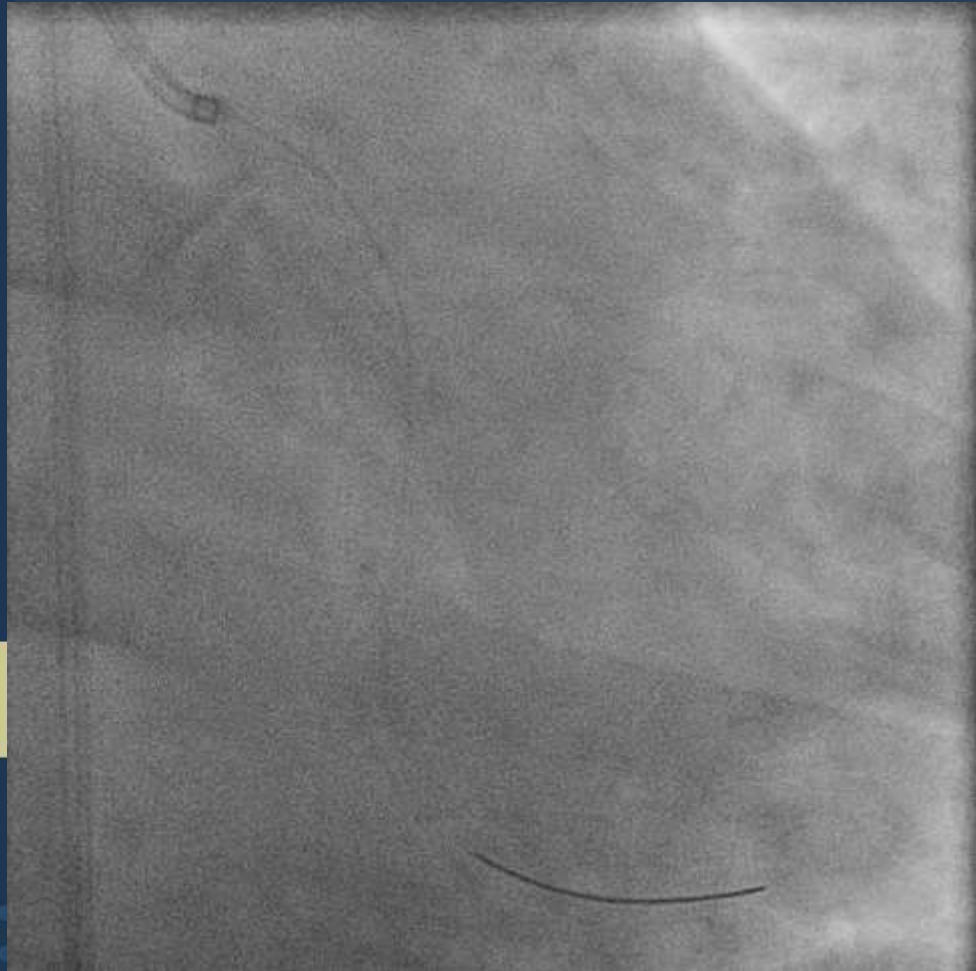




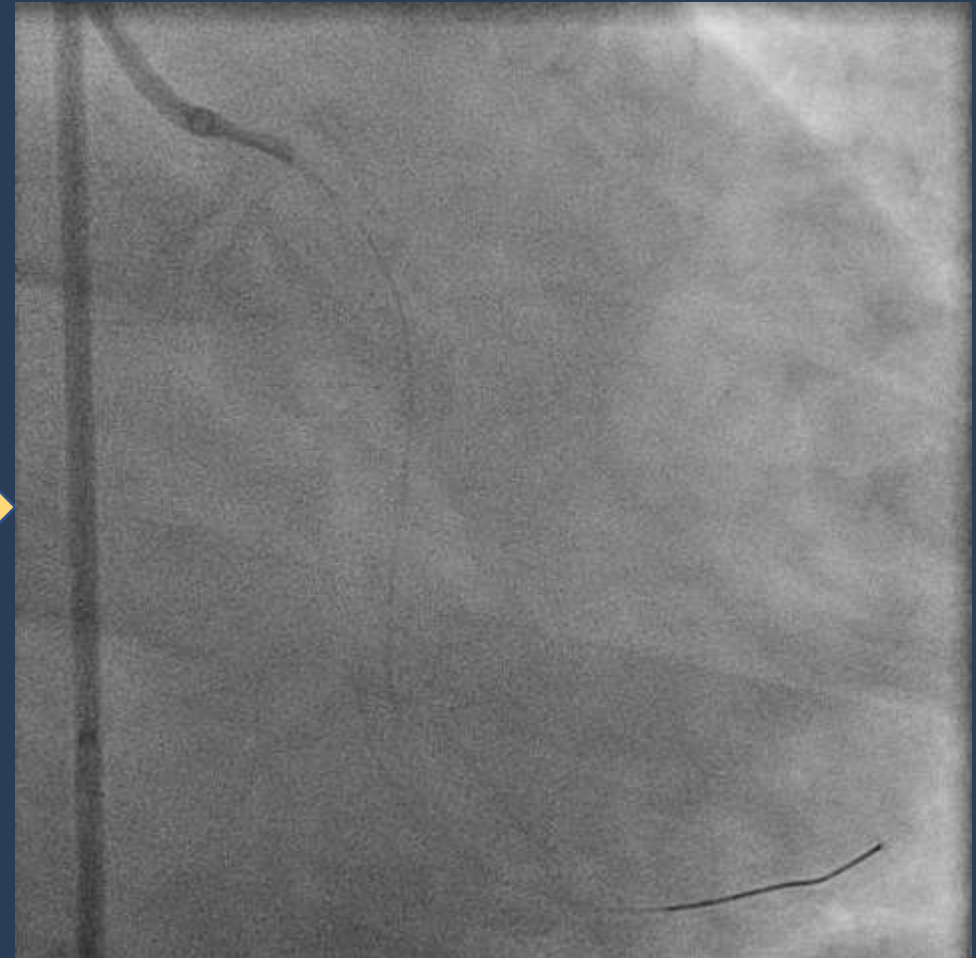
dLCx was stented with Biofreedom 3.5/24
POT with NC 4.5/6
Post-dilated with NC 3.5/10



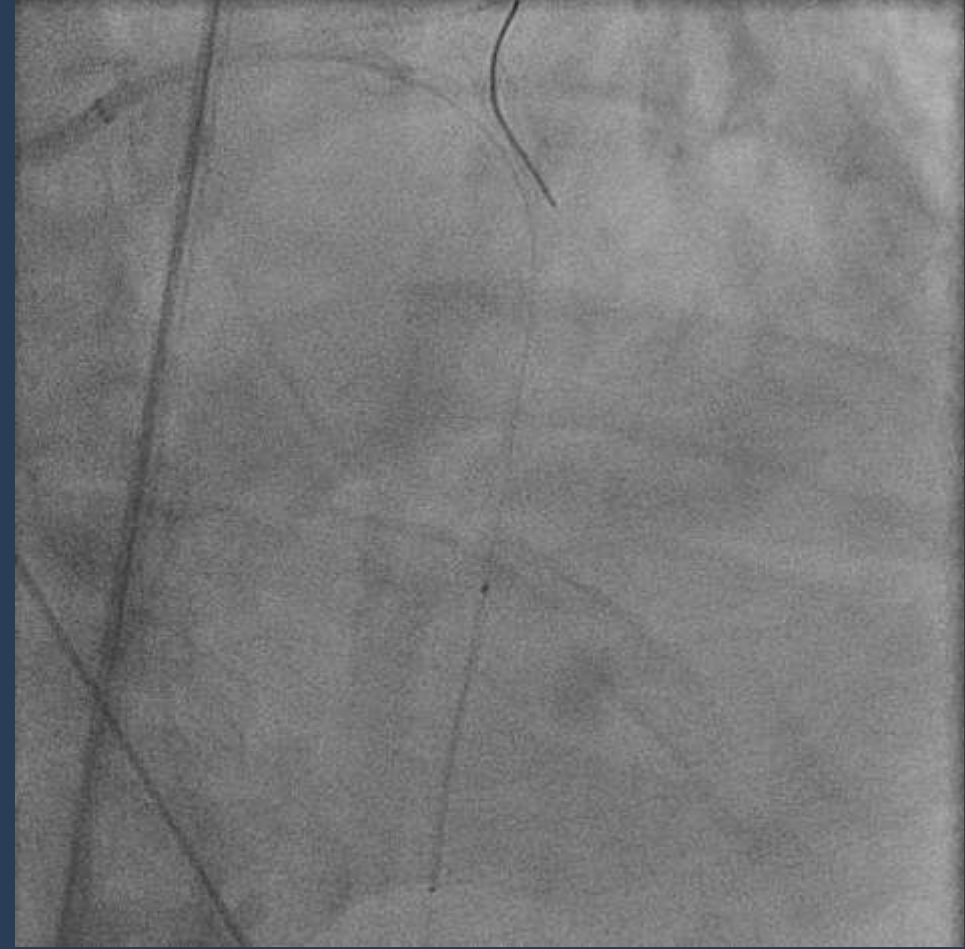
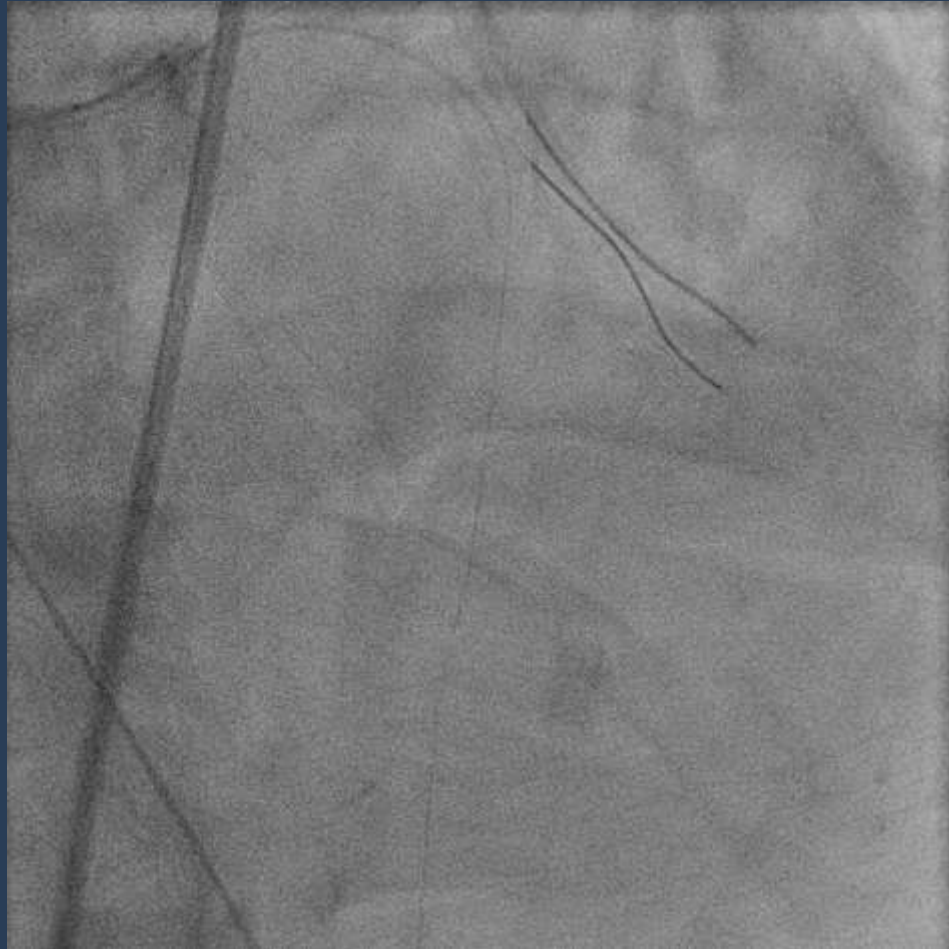
pLCx was stented with Biofreedom 3.5/33
Post-dilated with NC 5.0/15



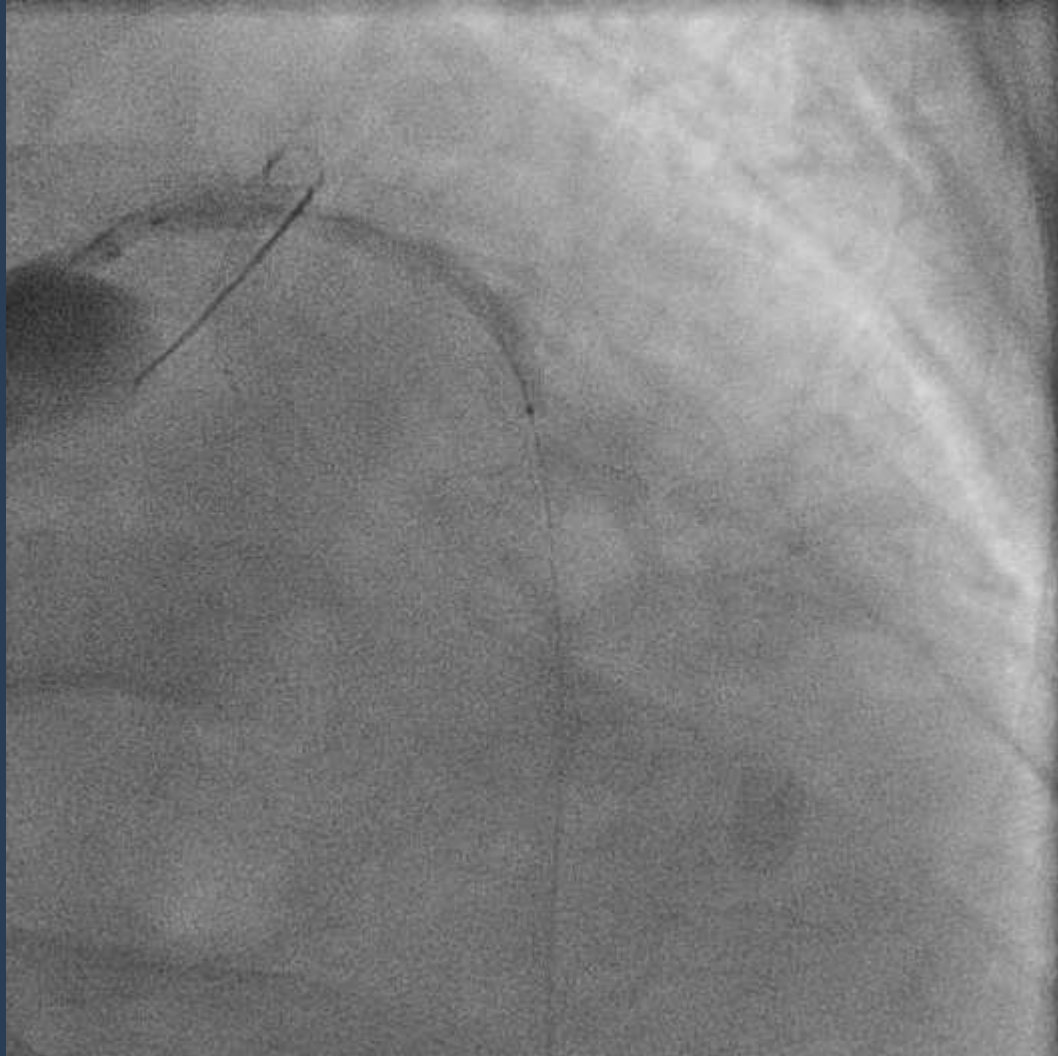
No-reflow,
adenoscan given



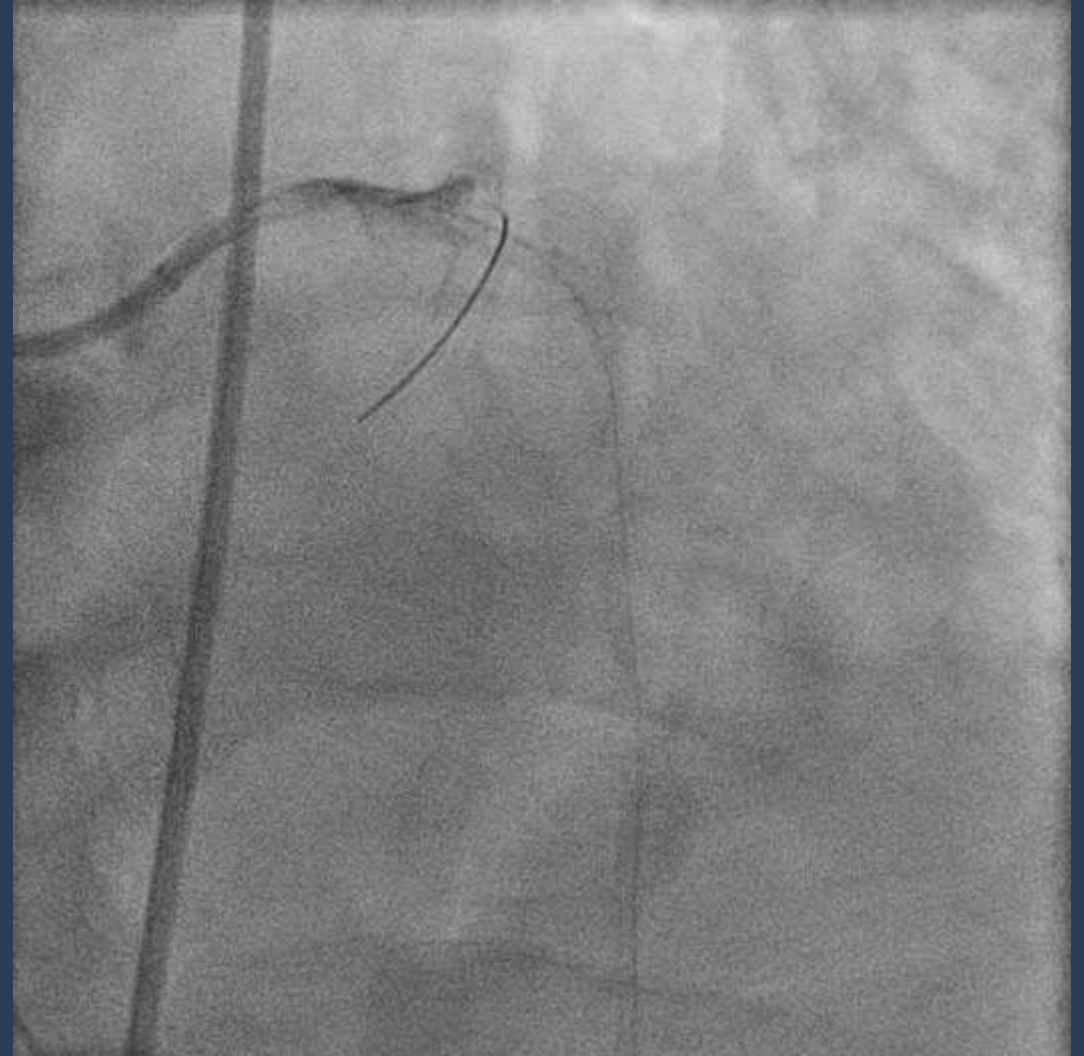
PCI to LAD



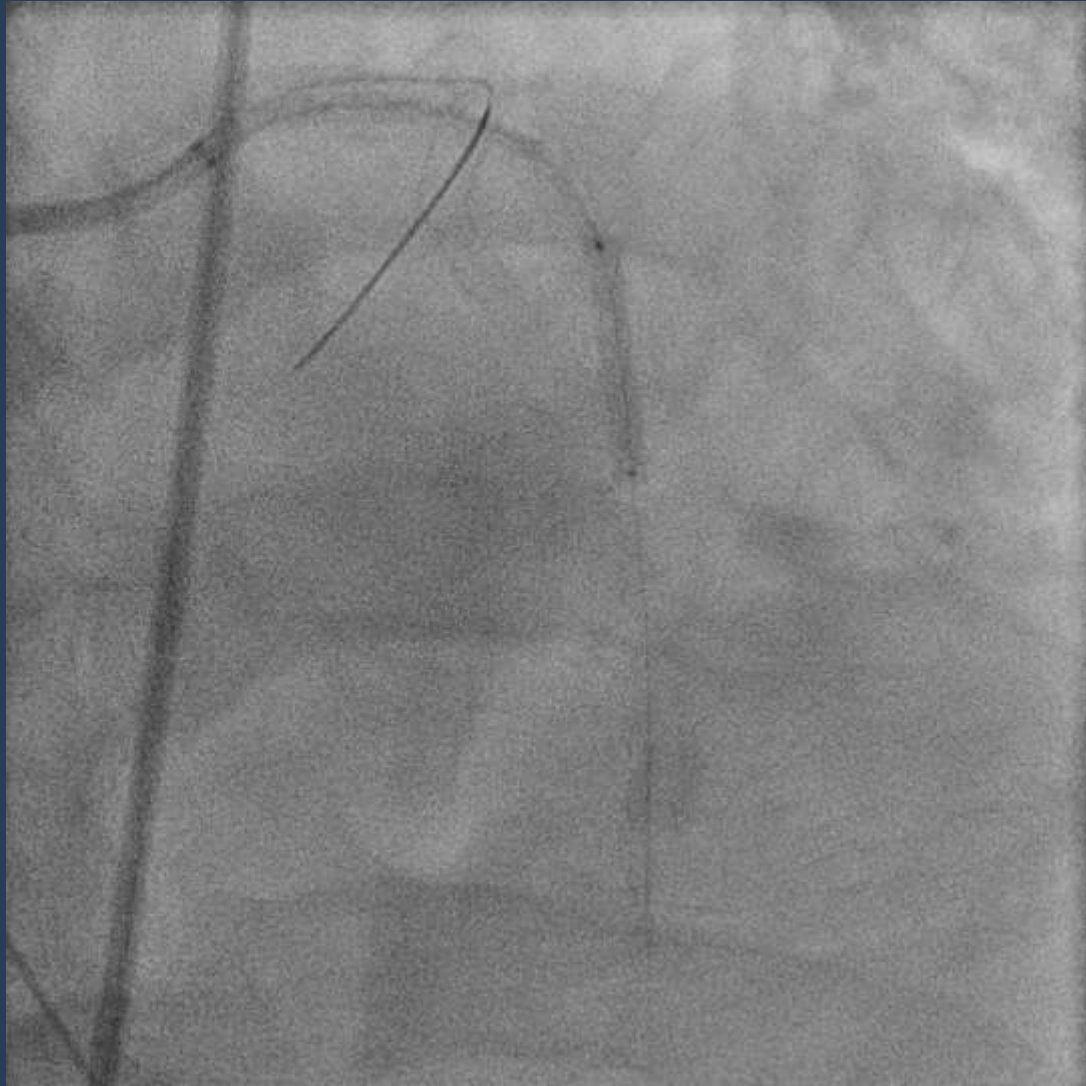
dLAD was stented with Biofreedom 2.25/29



Ostial to mid LAD was stented with Biofreedom 3.0/42



Distal stent edge landed on significant plaque



mLAD was stented with Biofreedom 3.0/19



Final angiogram showed TIMI III flow. Good D1 flow.

Progress

- Impella and reperfusion catheter was inserted after PCI
- EF improved to 30%
- Given levosimendan
- ECMO weaned off on POD3
- Weaned off Impella on POD6

Discussions

- **AMI with cardiogenic shock**
 - MCS or PCI first?
 - In this case, MCS saved life.
- **PCI to non-culprit vessel in cardiogenic shock**
 - Depends on coronary anatomy (multiple critical stenosis in LAD)
- **Adenoscan as treatment of no-reflow**
 - Effect is short-lasting
 - Doesn't cause hypotension

Conclusion

- MCS plays key-role in AMI with cardiogenic shock
- Use of objective assessment to guide revascularization plan