

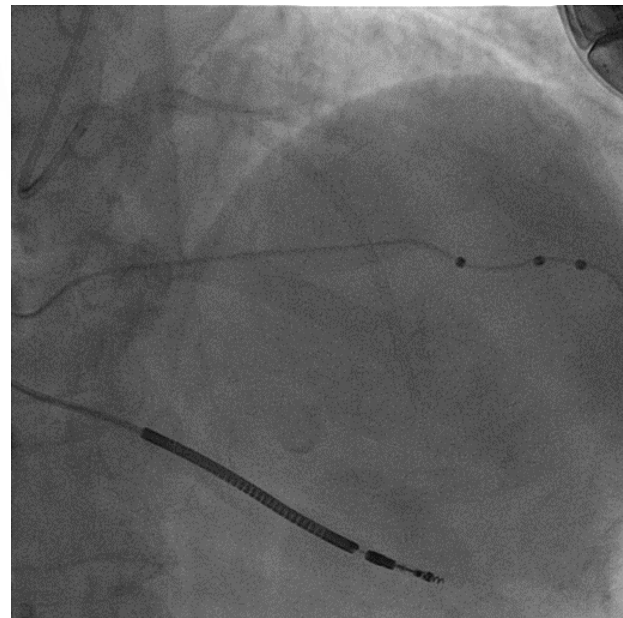
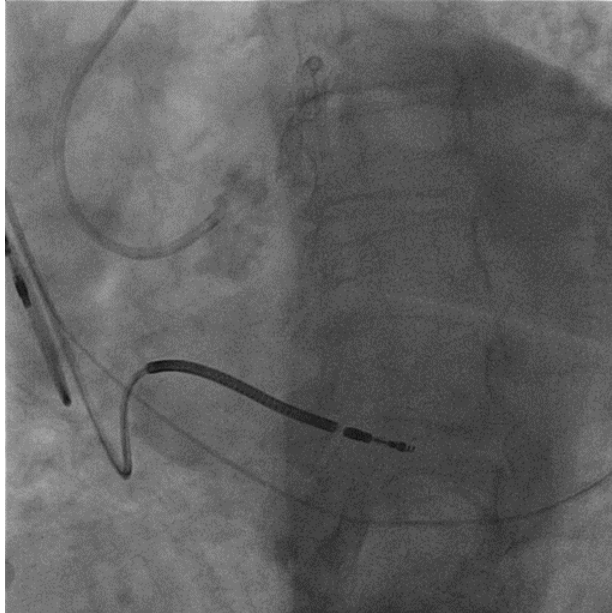
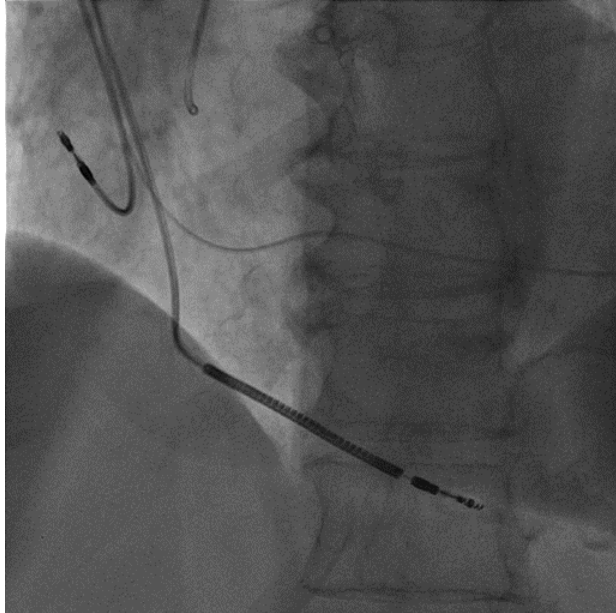
# Impella-assisted PCI: 4 technologies, 3 vessels, 2 bifurcations and 1 CTO

Aleksandra Gąsecka MD PhD

# 73-year-old woman

- Admitted due to exacerbation of heart failure to NYHA class IV
- Medical history:
  - Heart failure with reduced left ventricle ejection fraction
  - St. p. PCI of the left main, left anterior descending artery and diagonal branch with implantation of 5 everolimus-eluting stents (10/2020).
  - St. p. CRT-D implantation (02/2021)
  - Severe mitral regurgitation
  - Chronic kidney disease (G3a)
  - Diabetes type 2
  - Hypertension
  - Hyperlipidemia

# Angiography: 90% RCA, ISR LM/ LAD, CTO RCx

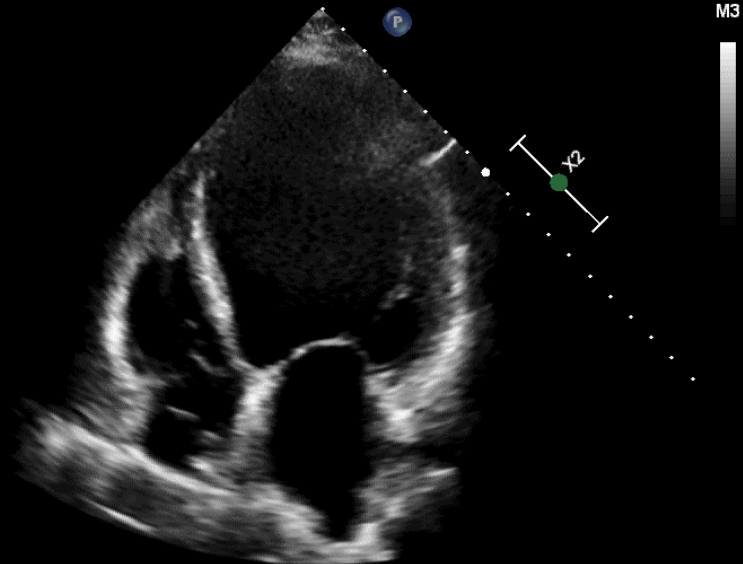


# TTE

Adult Echo

S5-1  
43Hz  
19cm

2D  
71%  
C 50  
P Low  
HGen



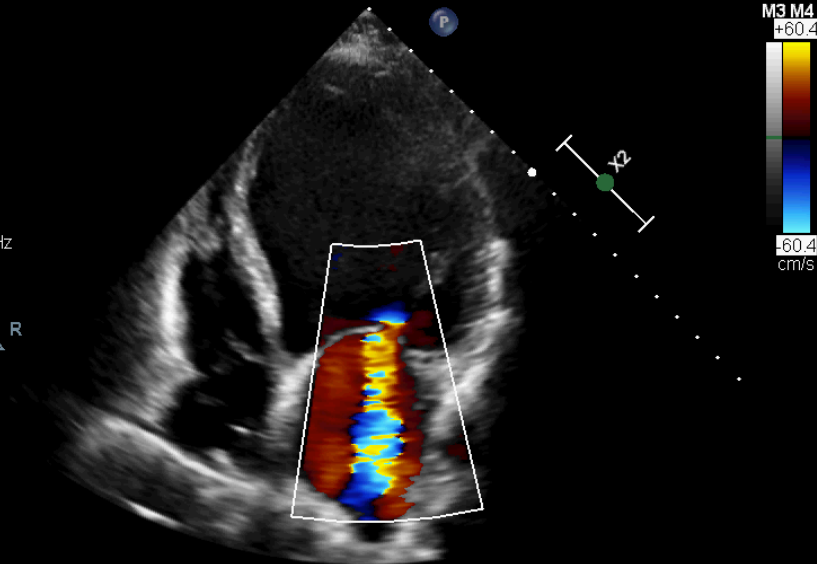
\*\*\* bpm

Adult Echo

S5-1  
22Hz  
19cm

2D  
73%  
C 50  
P Low  
HGen

CF  
48%  
3925Hz  
WF 392Hz  
2.5MHz



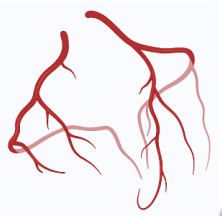
\*\*\* bpm



ACS  
Surgically ineligible  
Severe AS\*/ MR  
Age >75 years



Clinical characteristics

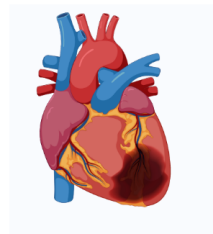


Unprotected left main  
Last remaining conduit  
Three-vessel CAD  
Complex CTO

Coronary anatomy

**High - risk patient**

Haemodynamic instability

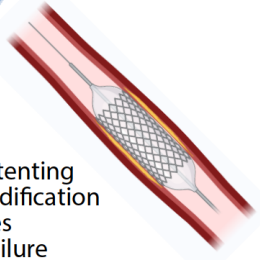


LVEF <35%  
SBP <90 mmHg or MAP <60 mmHg  
CI <2.2 L/min/m<sup>2</sup> or CPO <0.6W  
LVEDP >15 mmHg or CVP >15 mmHg

Procedural characteristics

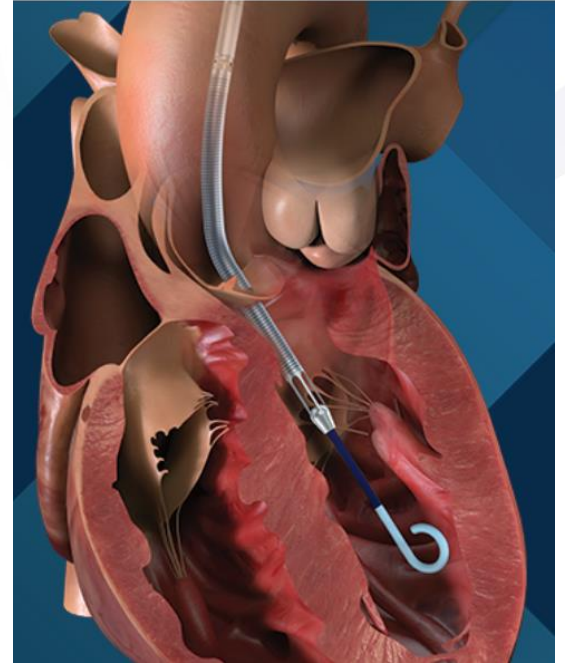


Complex bifurcation stenting  
Advanced calcium modification  
Retrograde approaches  
Previous procedural failure



# HeartTeam decision: Impella-assisted PCI

- MVD with high lesion complexity (Syntax score 47.5)
- High risk of perioperative mortality (EuroScore II 22.1%)





Impella peel-away sheath 14F

Femoral sheath 7F

Haemostatic valve

IMPELLA CP

Adult Echo

X7-2t

23Hz

12cm

2D

59%

C 50

P Off

Gen

CF

48%

6844Hz

WF 615Hz

4.4MHz



TISO.9

MI 0.3

0 111 180



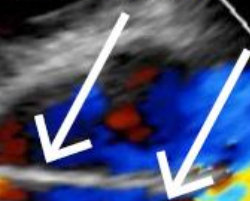
0 M4 M4  
+59



pigtail



cannula



aortic annulus

inlet



3.5 cm



outlet area  
with aliasing



x3



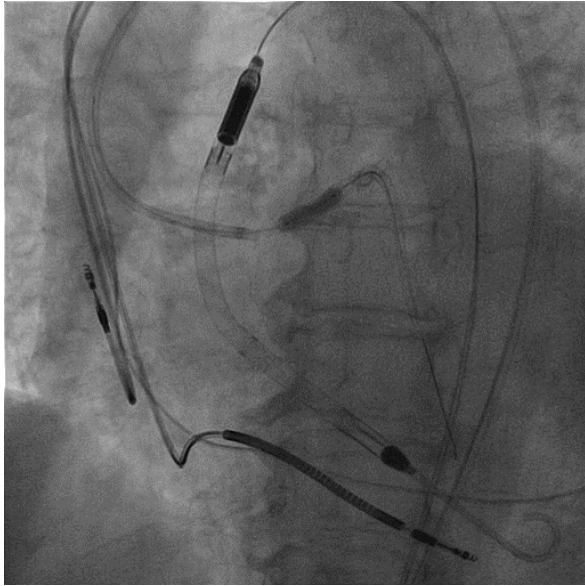
- 10

PAT T: 37.0C

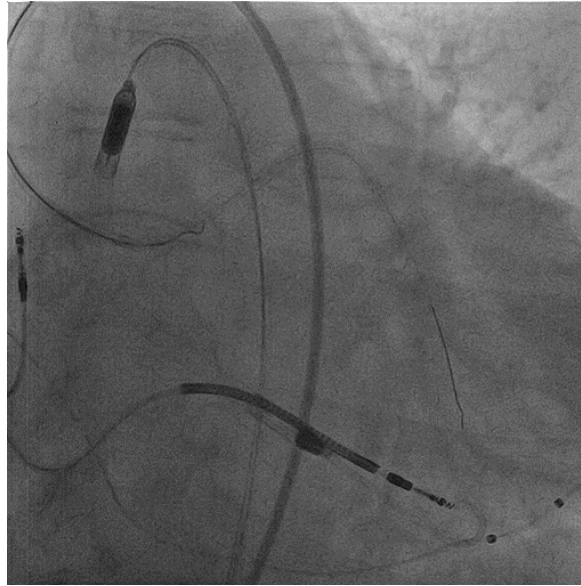
TEE T: 39.6C



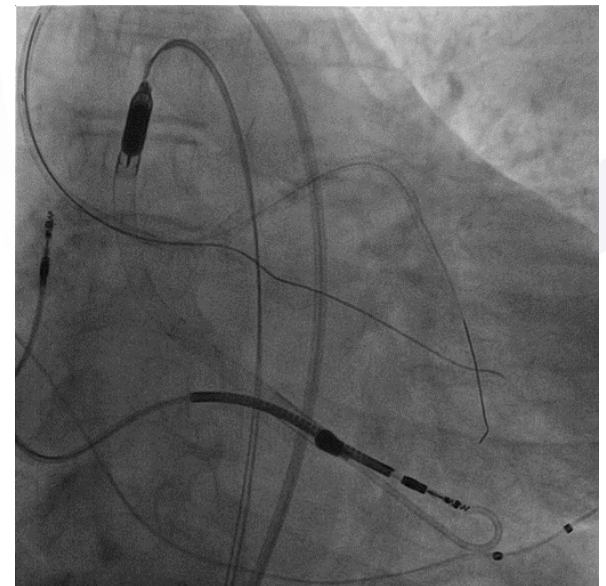
# CTO RCx



LM/LAD:  
Sion blue  
NC 4.0x15 mm (20 atm)

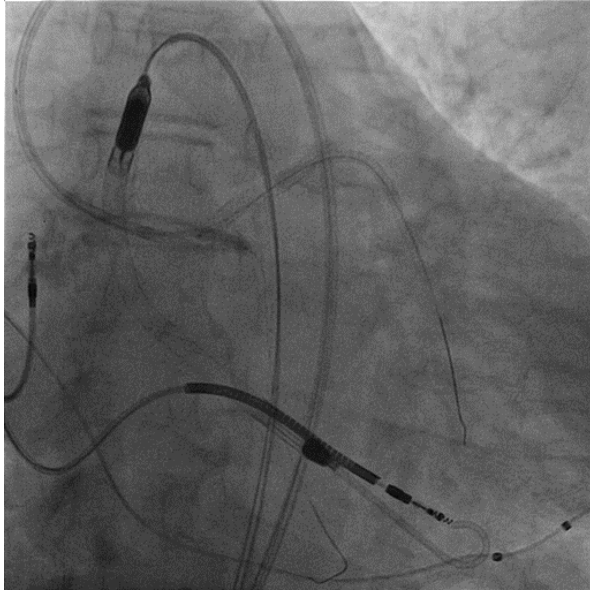


CTO RCx:  
Proximal cap antegrade penetration  
Supercross 90 & Fielder XTR  
NC 3.0x15 mm (18 atm)

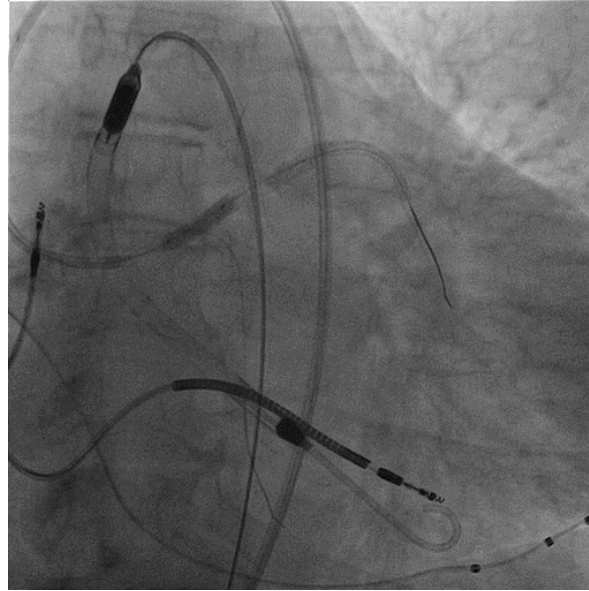


Control angiography

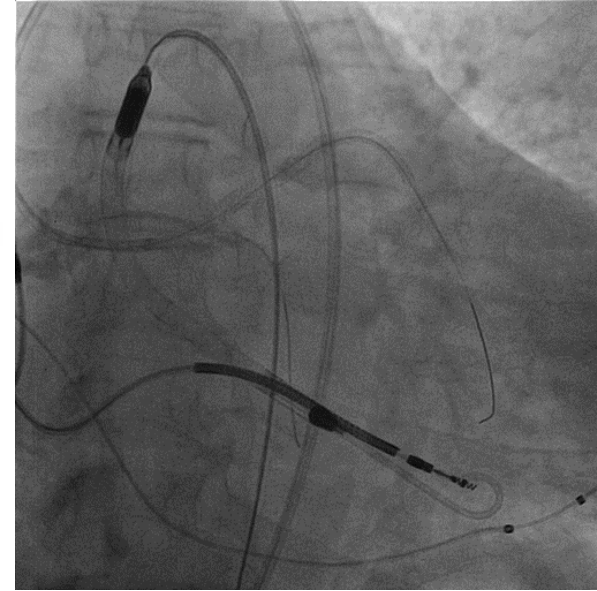
# Intravascular Lithotripsy



RCX: 3.0x12 mm (6 atm)

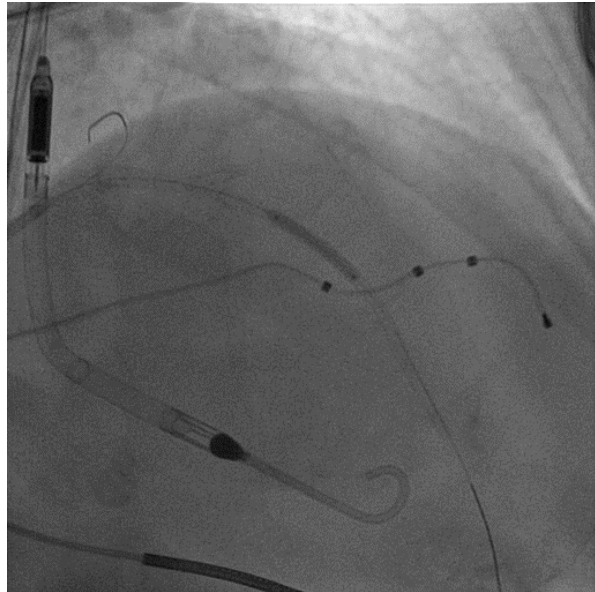
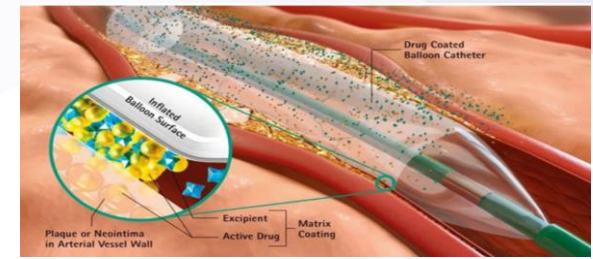


LM/LAD: 3.5x12 mm NC (6 atm)

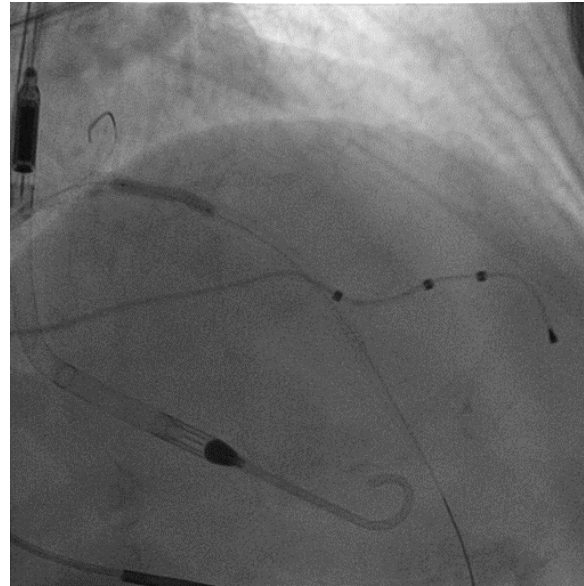


Control angiography

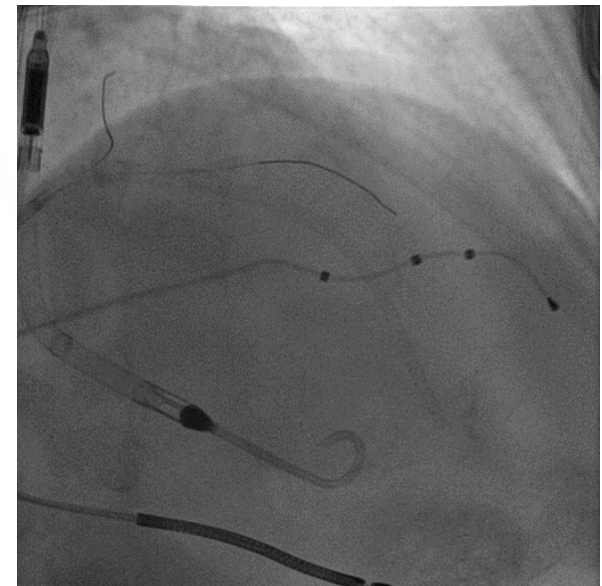
# Drug-eluting balloon



LAD: 3.0x30 mm (12 atm)

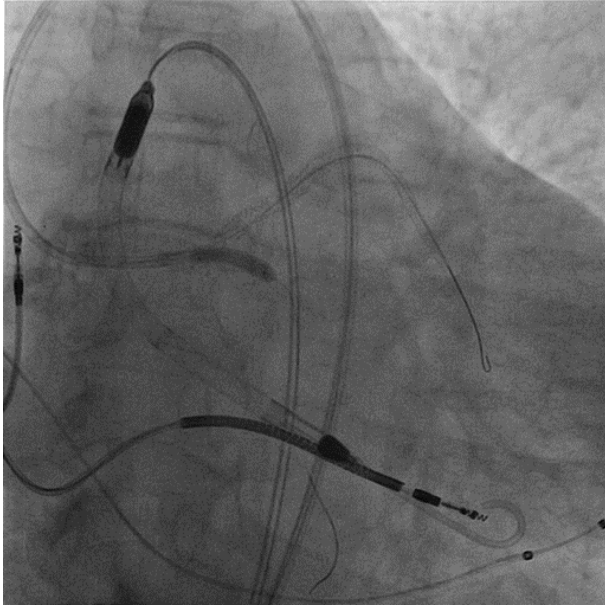


LAD: 3.5x20 mm (12 atm)

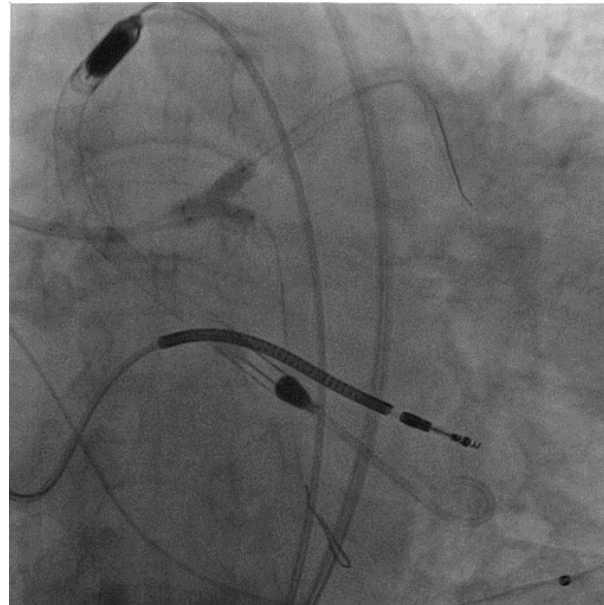


Control angiography  
(after POBA Dg1 2.0x15 mm, 16 atm)

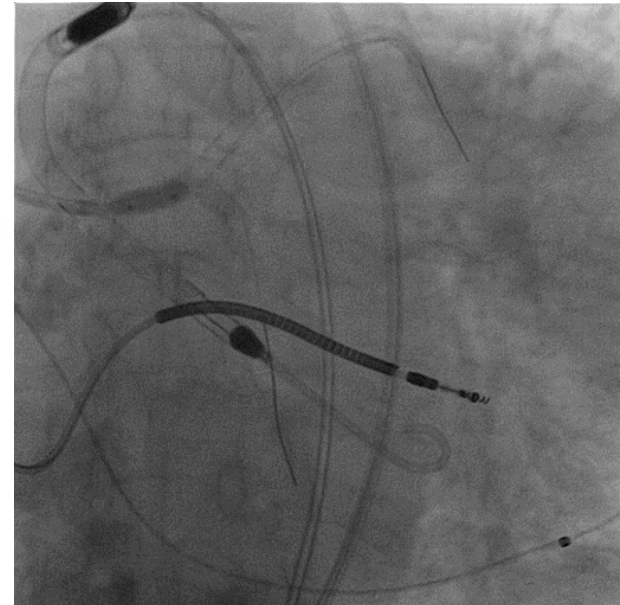
# RCx TAP stenting



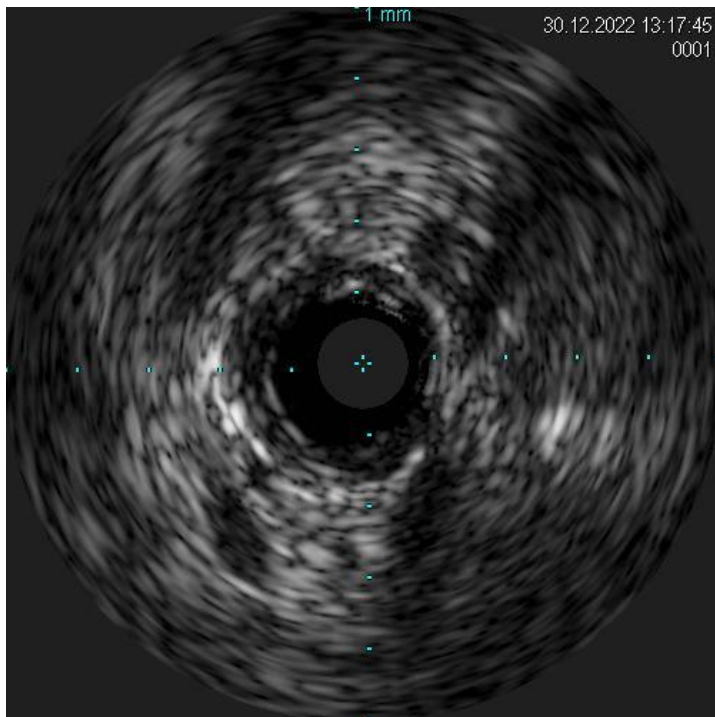
RCX: Xience 3.5x15 mm (16 atm)



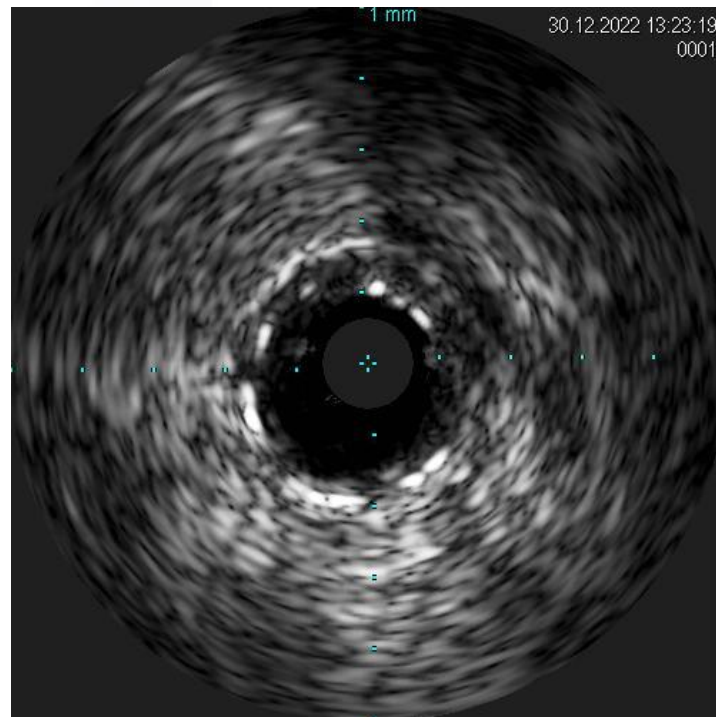
Kissing balloon  
RCX: NC 3.5x12 mm (16 atm)  
LM/LAD: 4.0x12 mm (14 atm)



POT  
LM: NC 5.0x8 mm (14 atm)



LAD: MLA 6.5 mm<sup>2</sup>



RCX: MLA 4.2 mm<sup>2</sup>

# Peri- & postprocedural Impella support

## Balloon inflation



## Remote monitoring via Impella Connect app



# Postprocedural management

- Laboratory monitoring
  - ACT/ APTT
  - Glucose
  - Hemoglobin
  - Platelets
  - Free hemoglobin, haptoglobine, LDH, bilirubine
  - Creatinine, electrolytes
  - WBC, lactates

- Anticoagulation
  - UFH
    - Purge system (U/hr): 25 U/mL UFH x 2 – 30 ml/hour
    - Systemic (U/hr): UFH per hospital protocol - UFH per purge system
  - Alternative
    - Argatroban: 20 mcg/uL in purge + systemic, if needed
    - Bivalirudin: 50-100 mcg/uL in purge + systemic, if needed

- Hemodynamic monitoring
  - Smart Assist
    - SBP >90 mmHg
    - MAP >60 mmHg
    - CI >2.2 L/min/m<sup>2</sup>
    - CPO >0.6W
    - LVEDP <15 mmHg
  - Pulmonary artery catheter
    - CVP <15 mmHg
    - PAWP <15 mmHg
    - PAPi >0.9

- Impella position & parameters
  - TTE/ TEE
  - Fluoroscopy
  - Smart Assist
  - Aorta pressure
  - LVEDP
  - Motor current
  - Purge
    - Flow: 2-30 ml/h
    - Pressure: 300–1100 mmHg

# Clinical course

- Hypotonia:
  - Impella support continued for 2 days, then removed
- Complications:
  - Hb drop 11.7 -> 8.7 g/dL -> transfusion of 3 RBC units
  - Contrast-induced nephropathy -> did not require dialysis
- ECG: No new ischaemic changes
- Echocardiography: EF 20%, severe MR
- Dual antiplatelet therapy: aspirin and ticagrelor for 12 months
- Discharged home on postprocedural day 14



# Follow-up TTE @ 3 months

- LVDD 72 mm -> 68 mm
- EF 13% -> 23%
- Severe -> moderate MR
  - ERO 0.34 cm<sup>2</sup> -> 0.16 cm<sup>2</sup>
  - MR vol 50 ml -> 33 ml
- Moderate -> mild TR
- SPAP 60 mmHg -> 25 mm Hg



Thank you for attention