

Case Sharing-STEMI requiring MCS; Device complication and management

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Disclosure

- I have nothing to disclosure

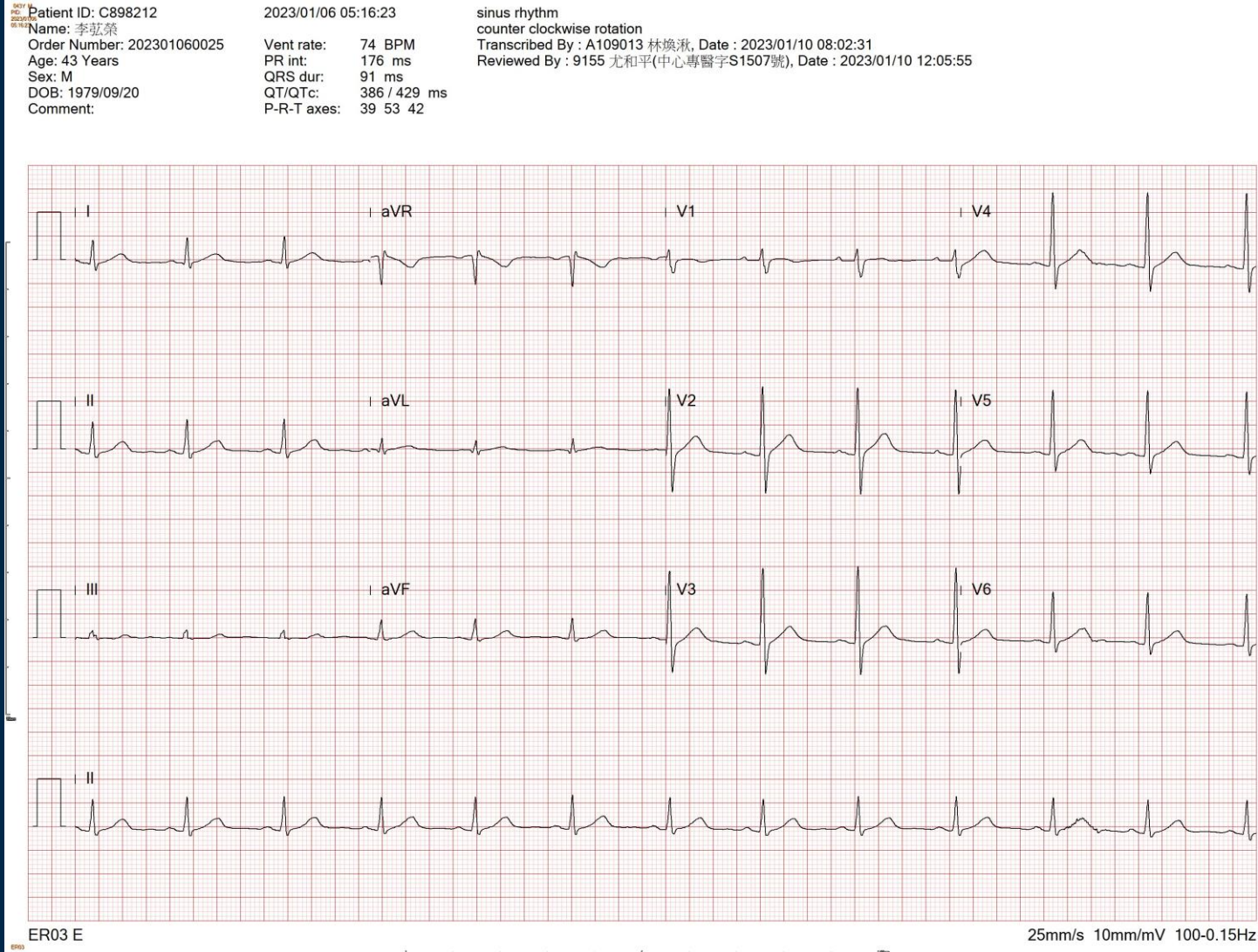
The challenging when treating STEMI with cardiogenic shock (CS)

- Despite advances in the treatment options, CS mortality remains high at 35–50%
- Inotropes and vasopressors have side effects and there is limited evidence to prove that any one vasopressor or inotrope was superior to another in terms of mortality
- IABP has no benefit in STEMI with CS
- Mechanically circulatory support (MCS) has taken over
 - Provide sufficient cardiac output
 - Placement of MCS device for high risk PCI has shown to improve outcomes
- Complications on MCS devices are not uncommon, and it is associated with significant increase in morbidity and mortality

Case 1

- A 43 y/o male, BW 120 Kg, walked in ER due to precordial distress for three hours
- At ER, he developed loss of consciousness after chest radiography, the ECG showed ventricular fibrillation
- Defibrillation 200 j, VF terminated
- Patient regained consciousness
- ECG showed acute extensive anterior MI

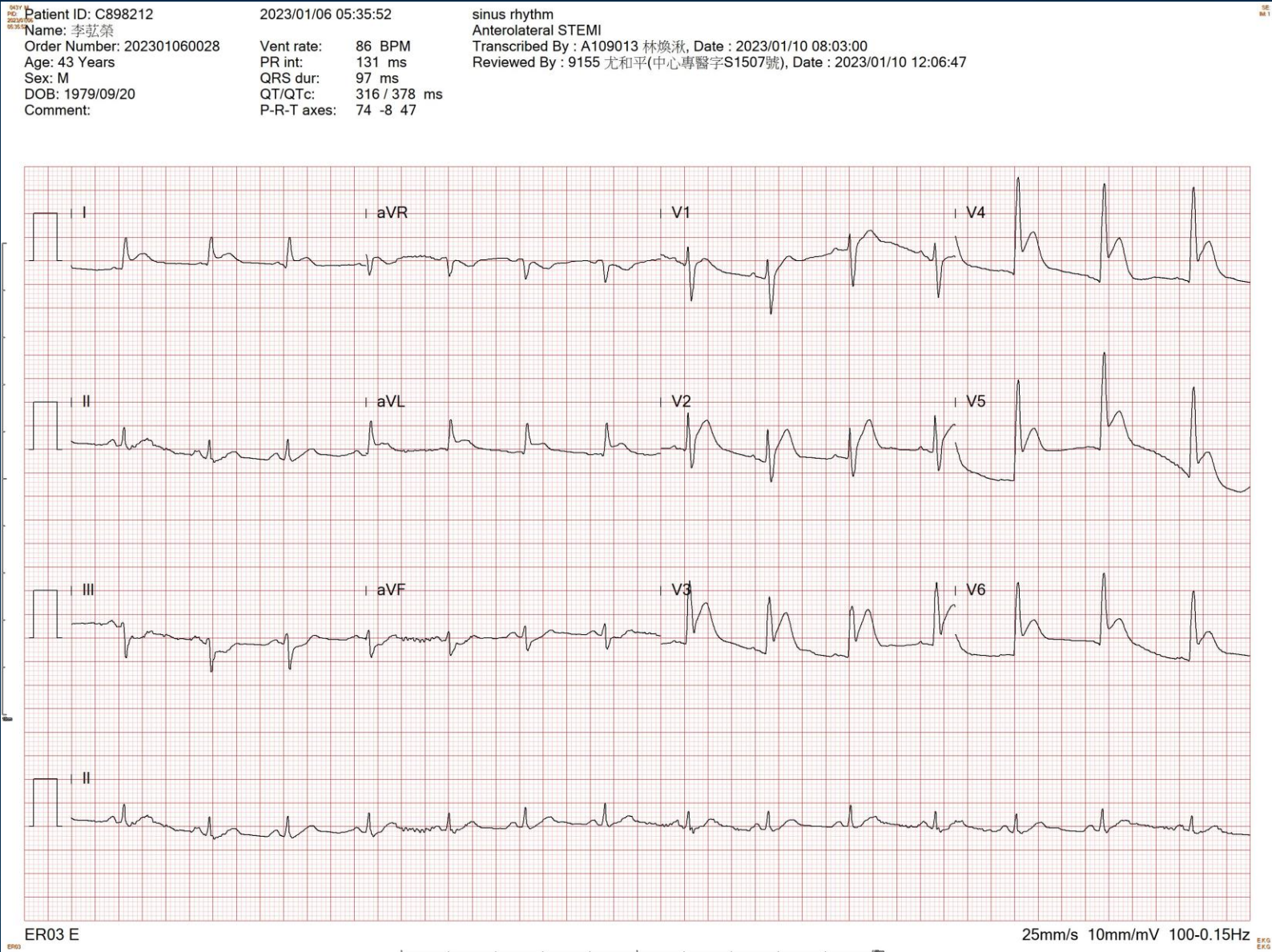
ECG: arrival at ER



ECG after chest x-ray at ER



ECG after Defibrillation and CPR



But, soon.....

- The patient developed hypotension with bradycardia followed by PEA, CPCPR started again, and ECMO was placed during CPR
- Patient was sent to cath lab for primary PCI

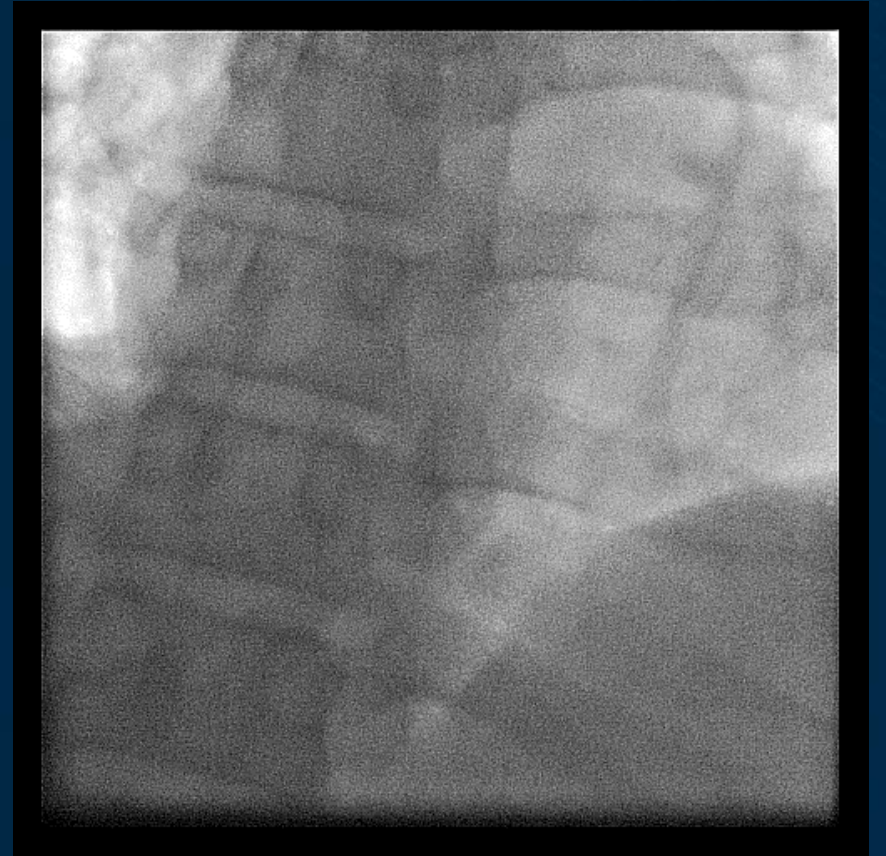
At Cath lab.



Vein cannula

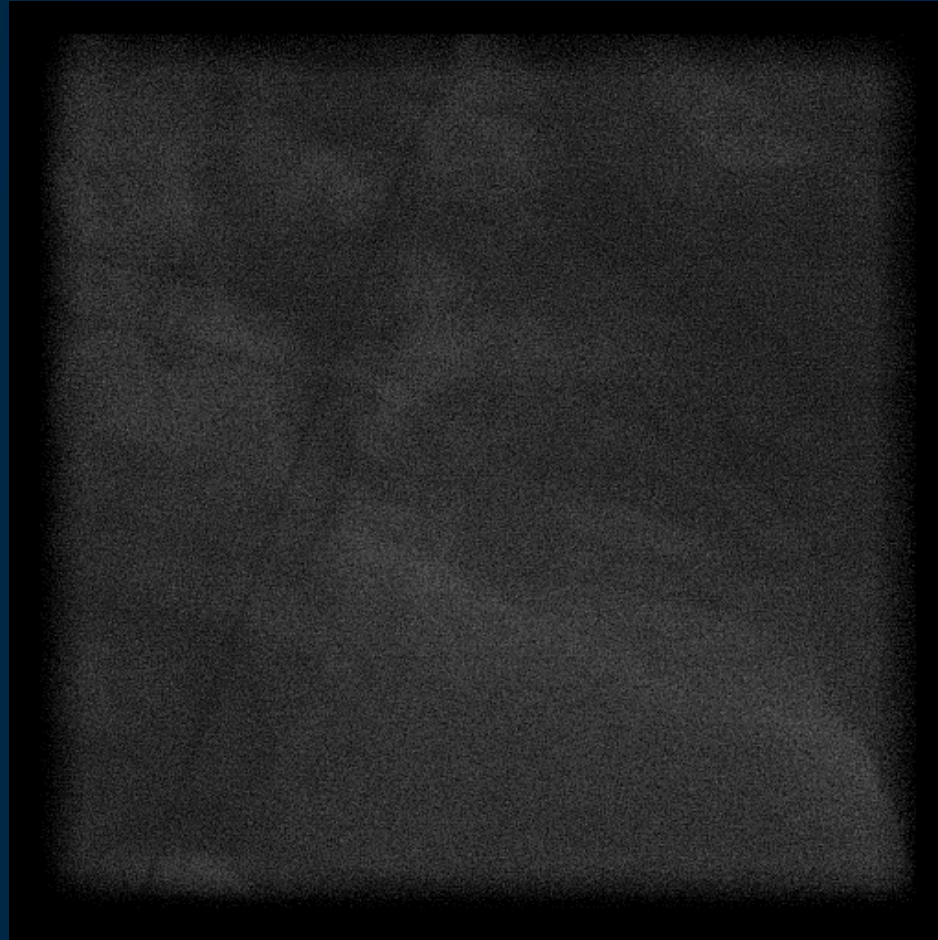


Punctured the plastic part of arterial cannula for PCI access



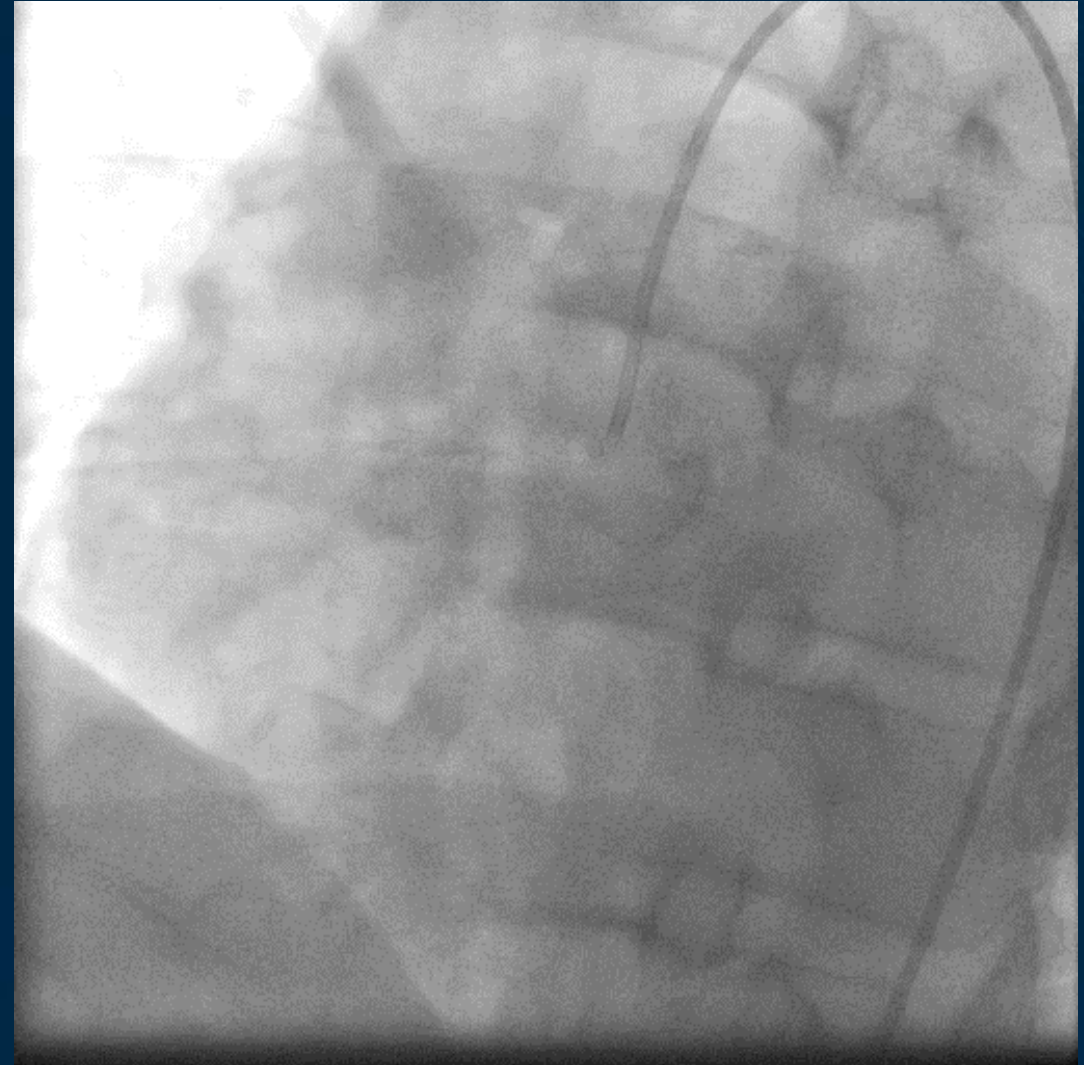
GW in IVC.....means.....
(VA → VV)

Still severe hypotension, and profound shock. CPR started

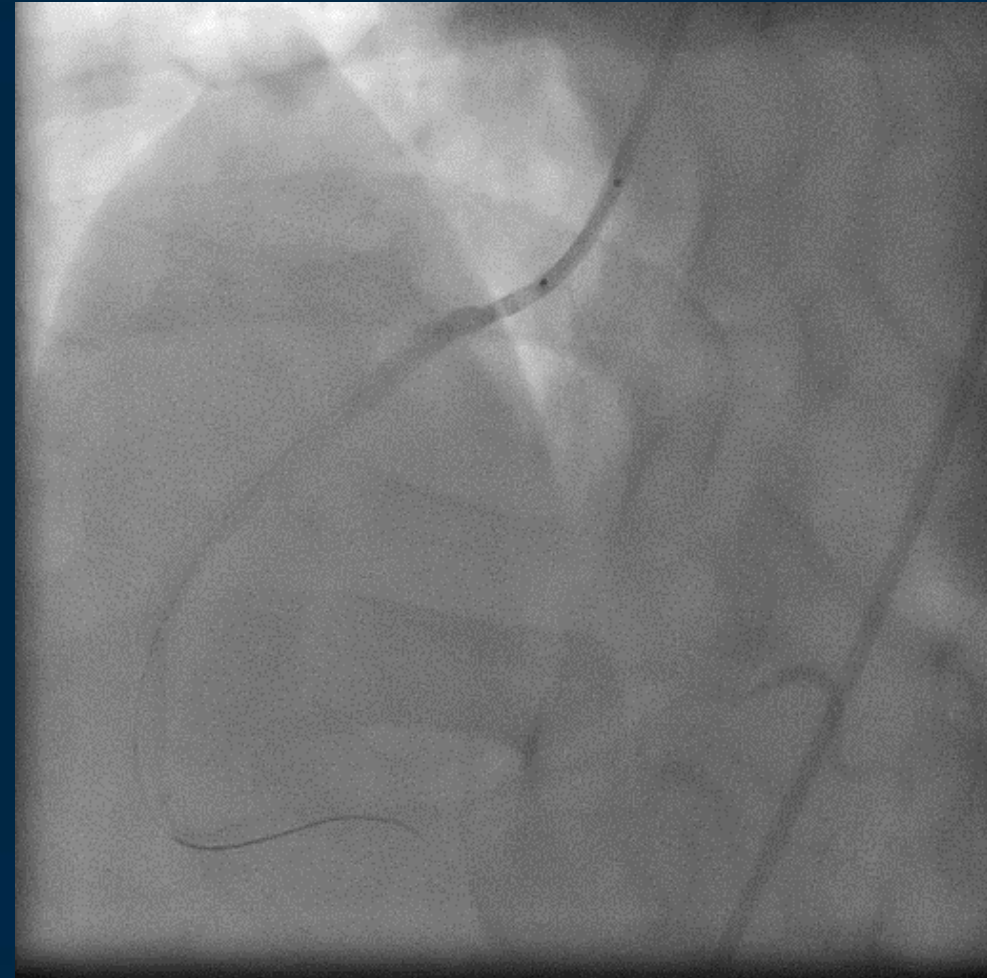
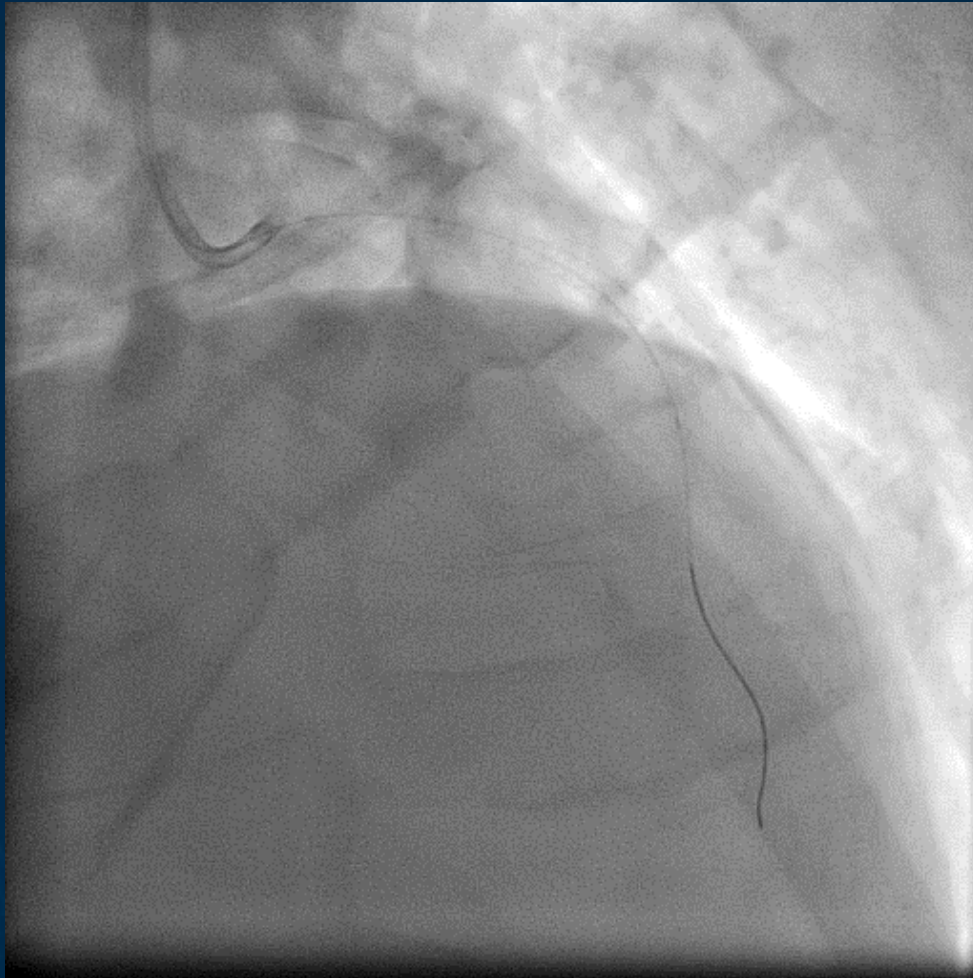


Re-punctured and inserted A-cannula via CFA

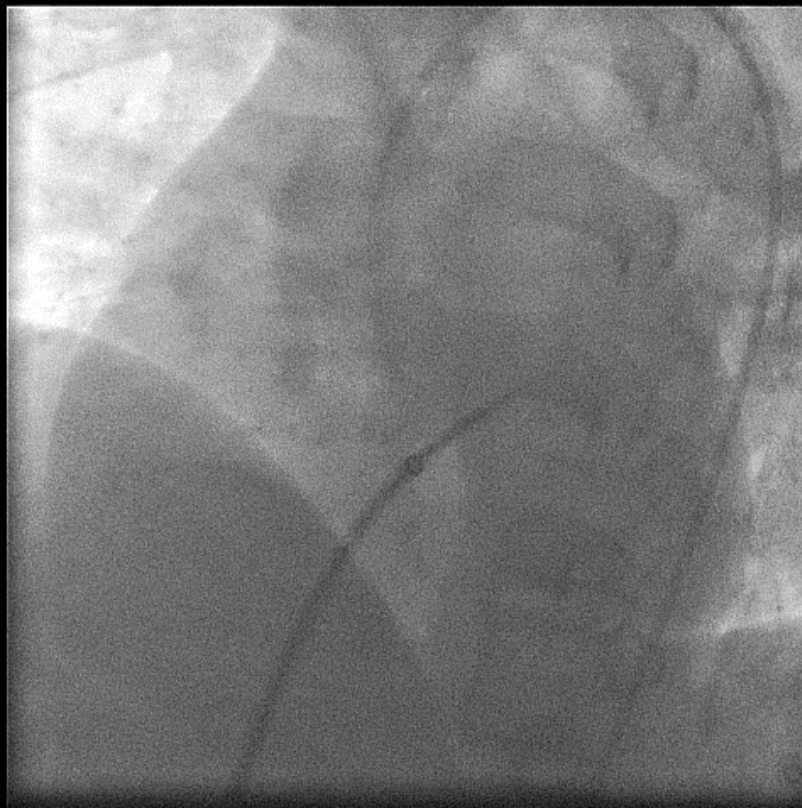
CAG showed P-LAD occlusion (culprit lesion) and mid-RCA critical stenosis



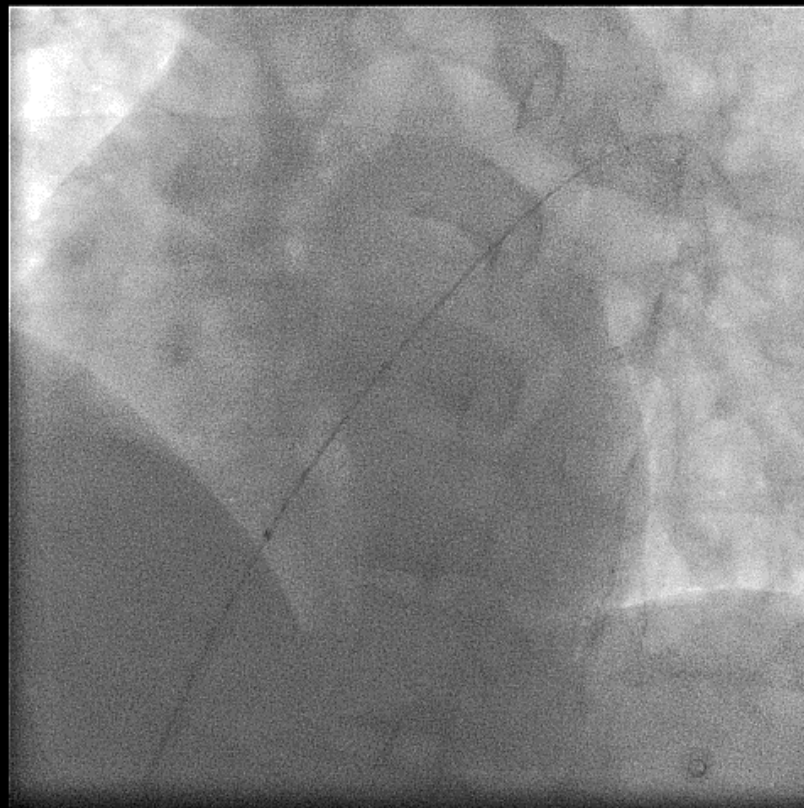
PCI with stenting to LAD and RCA



Trans-septal puncture for LA-VA ECMO



Transeptal puncture



Balloon atrial septostomy



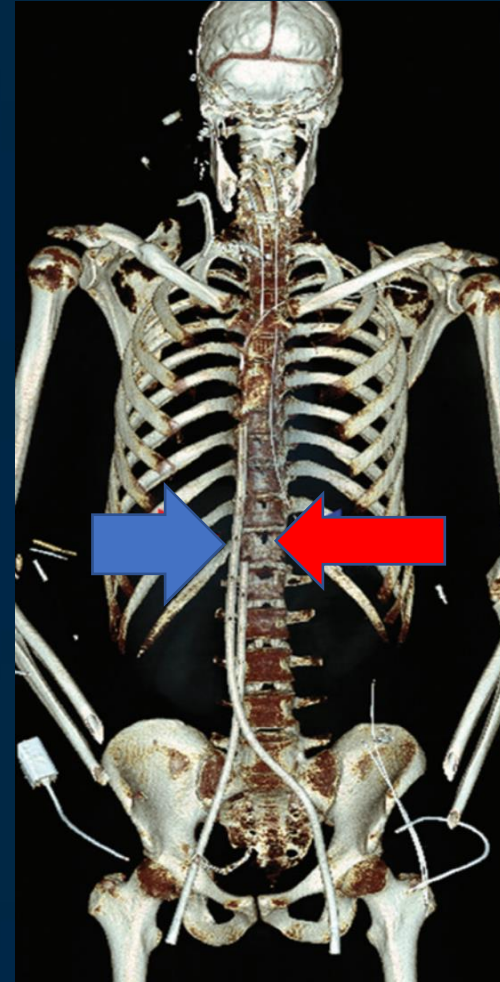
Inserted a V cannula to LA

Cannulation of a wrong Vessel

- Unintentional cannulation of a wrong vessel may cause a life-threatening situation (VA \longrightarrow VV)
- A vein for an artery can occur under emergency conditions, like profound shock or during CPR.
- The support is not possible and the patient most likely is threatened with imminent or early death
- Main underlying reasons are responsible for cannulation failure:
 - 1) obese patients
 - 2) resuscitation scenarios
 - 3) severe vascular calcifications or scarring
 - 4) blind puncture

Clues of VA to VV

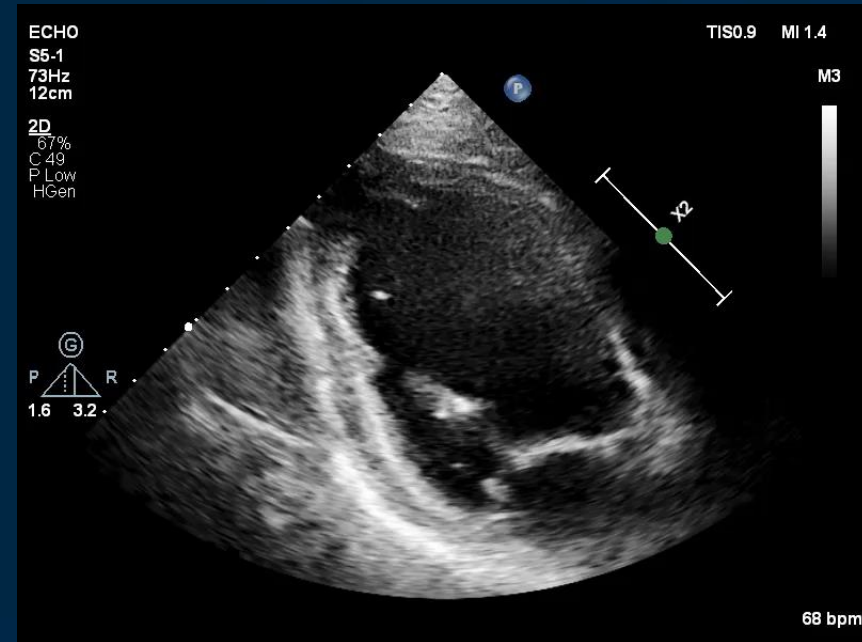
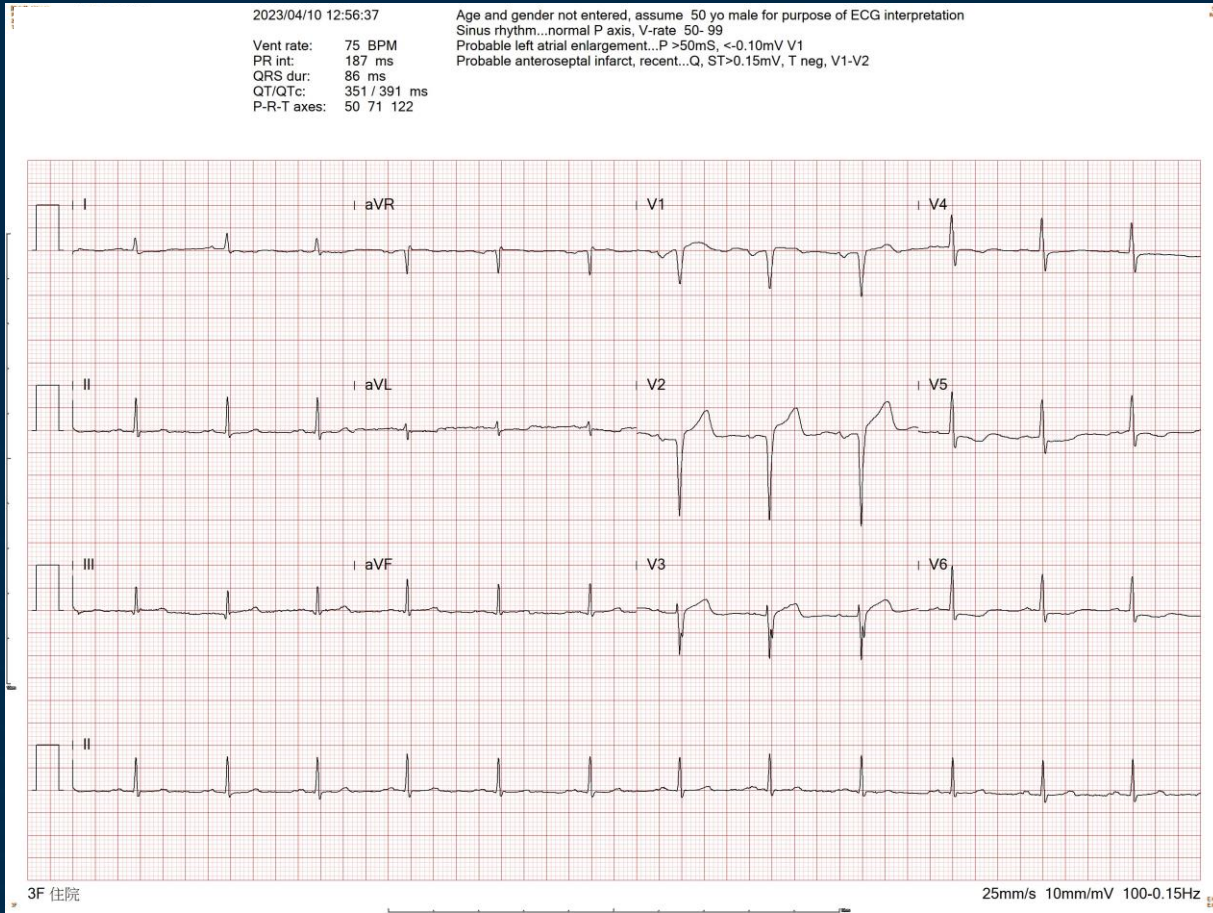
- No cardiovascular stability with an adequate blood pressure can be achieved
- High recirculation of blood, and the color of blood in both cannula are the same
- Pictures of worsening hypoxia, and progressively decreasing peripheral O₂ saturation, usually below an SpO₂ of 86%



Case 2:

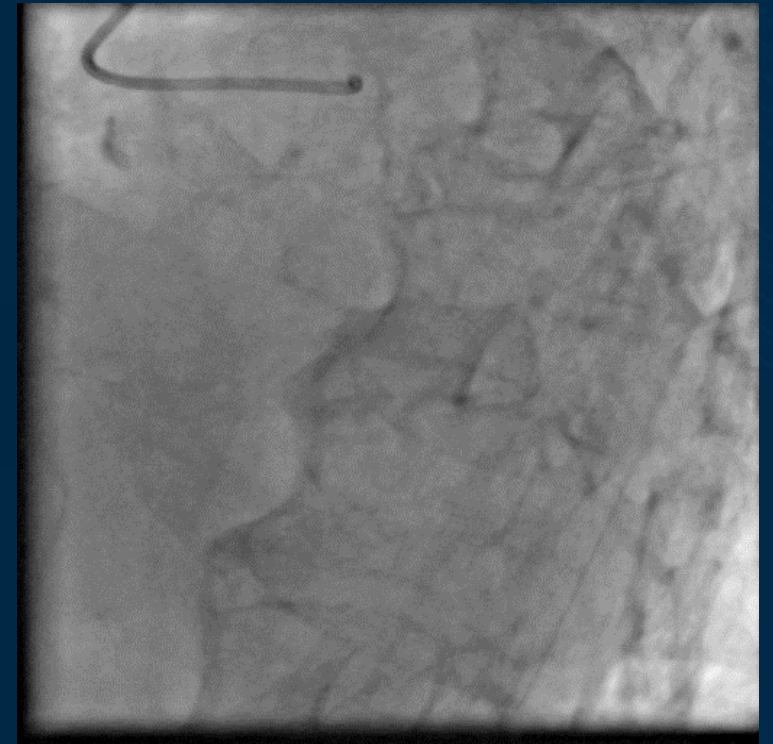
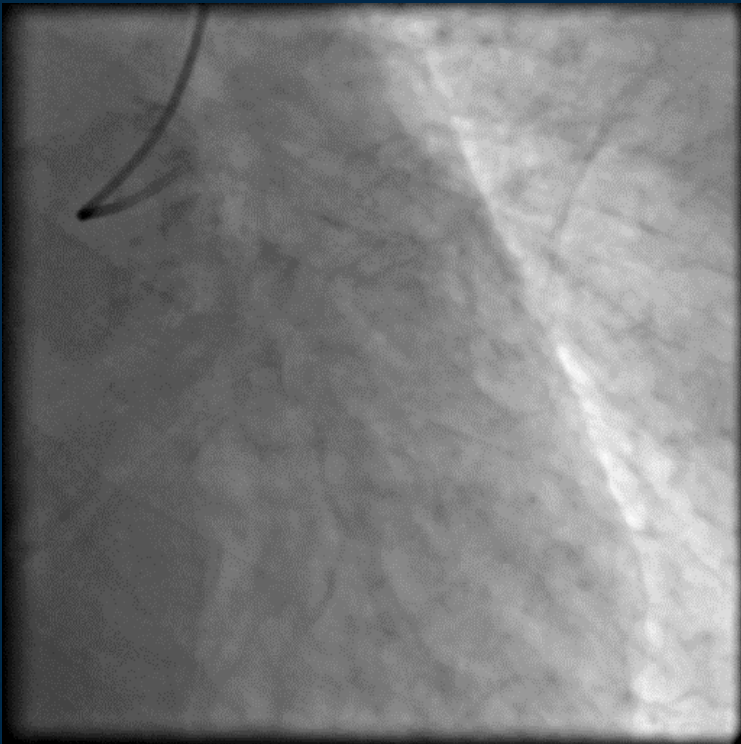
Mr. Cheng, 73 y/o, Intermittent chest distress and DOE
Hx of T2DM for 20 years

Echo: LVEF 20%, AVA 0.7 cm²; RVSP 57 mmHg;
RVEF: 55%

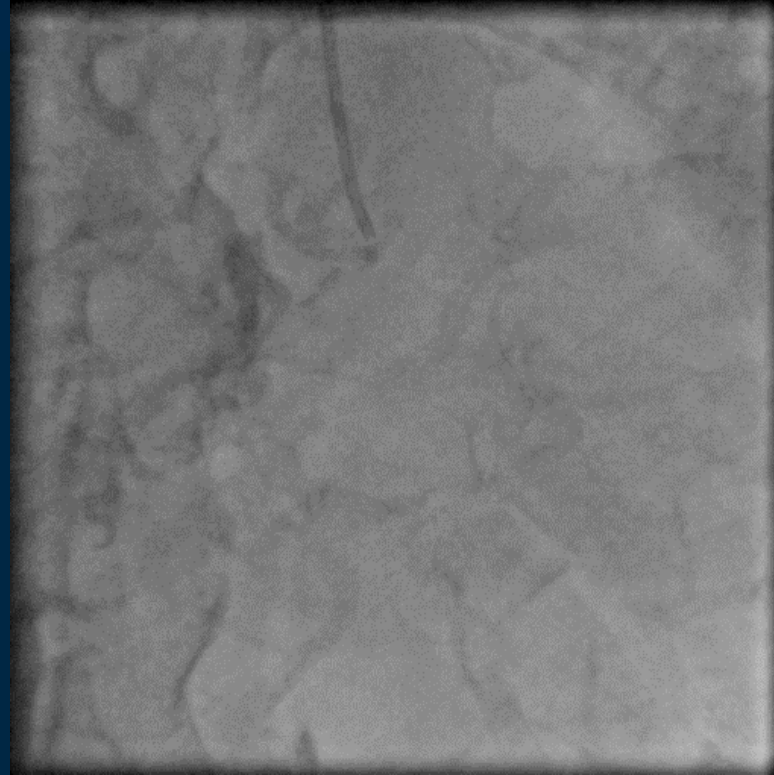
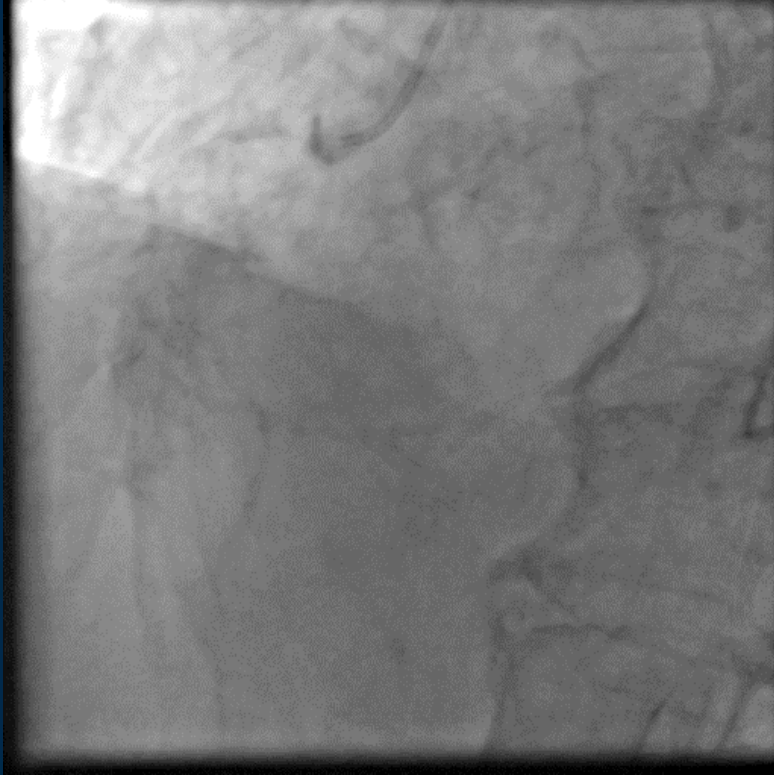


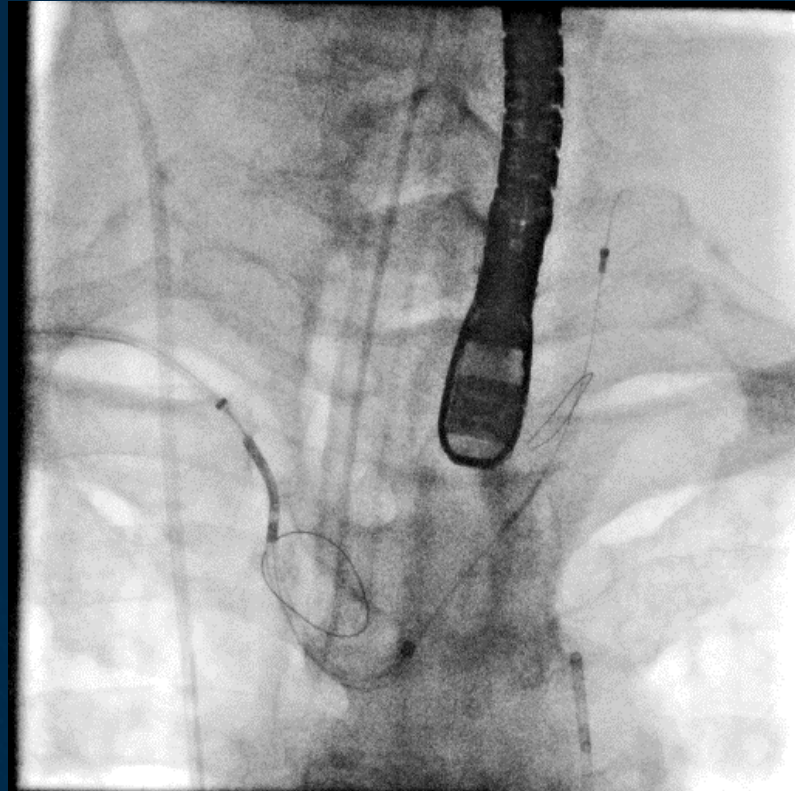
Troponin I : 2144.8 pg/mL (< 60.4)

CAG - Left coronary arteries

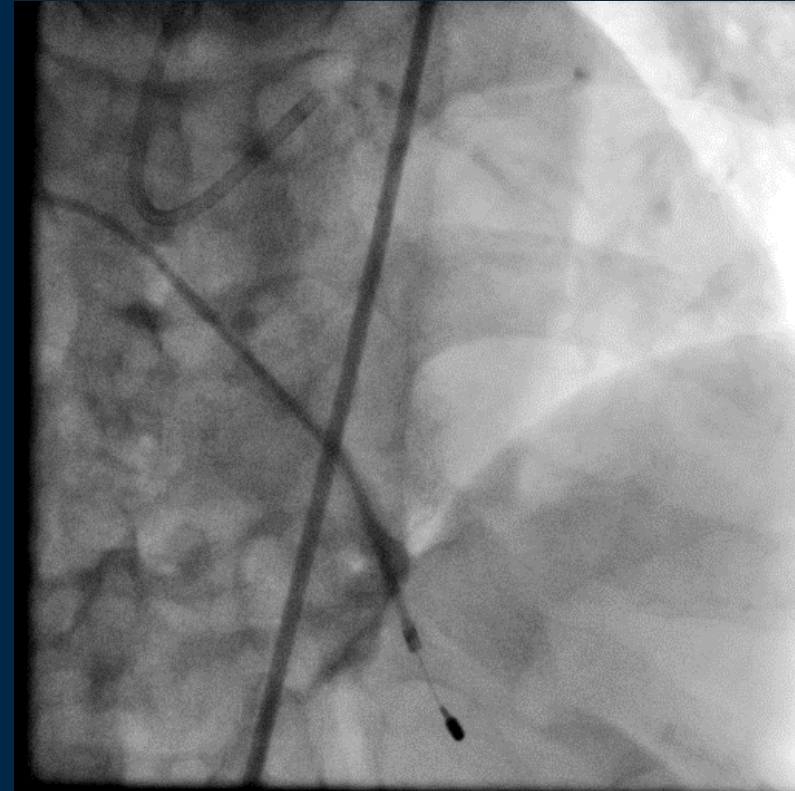


CAG - Right coronary artery

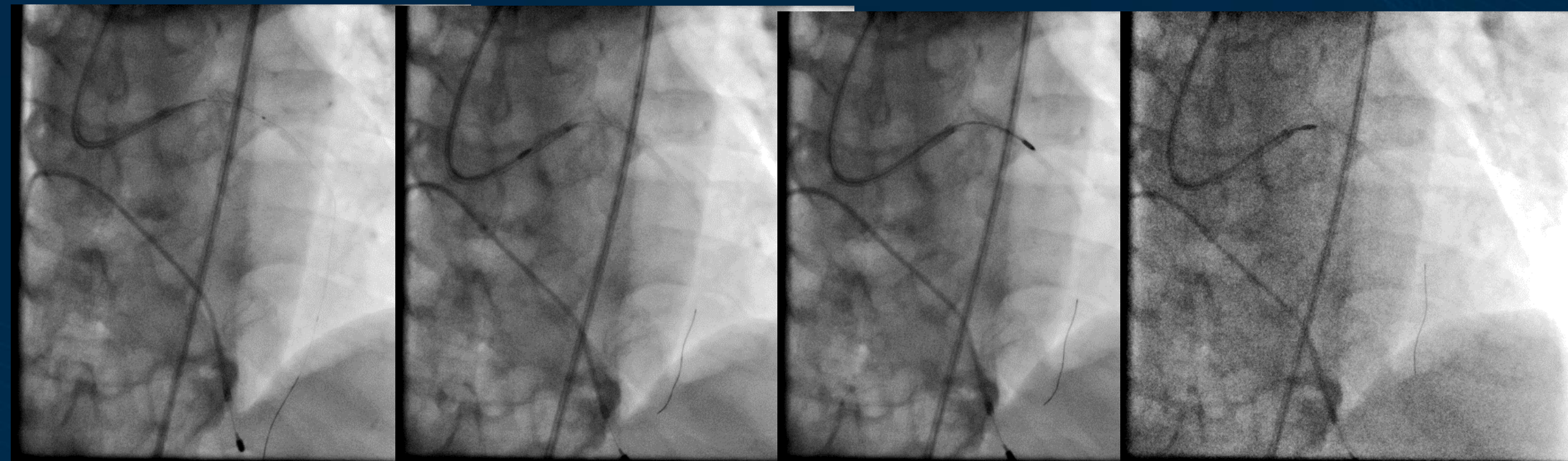




Sentinel EPD

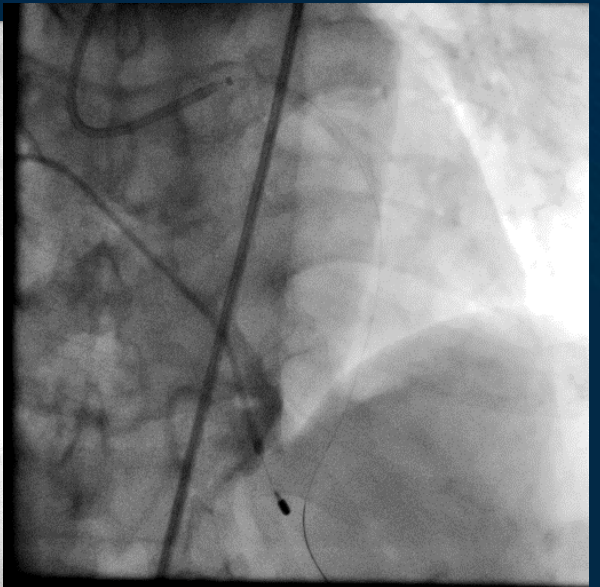
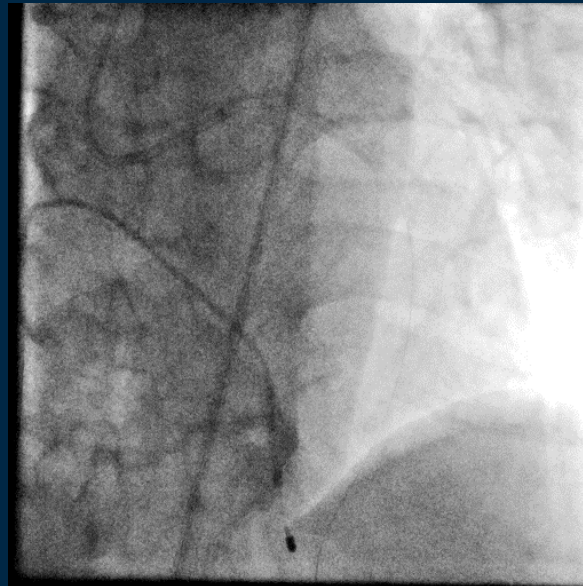
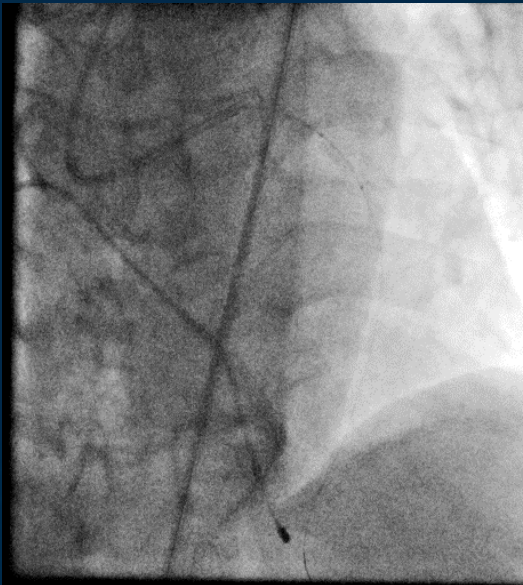


Severe LM stenosis, LAD heavy calcification with diffuse lesion



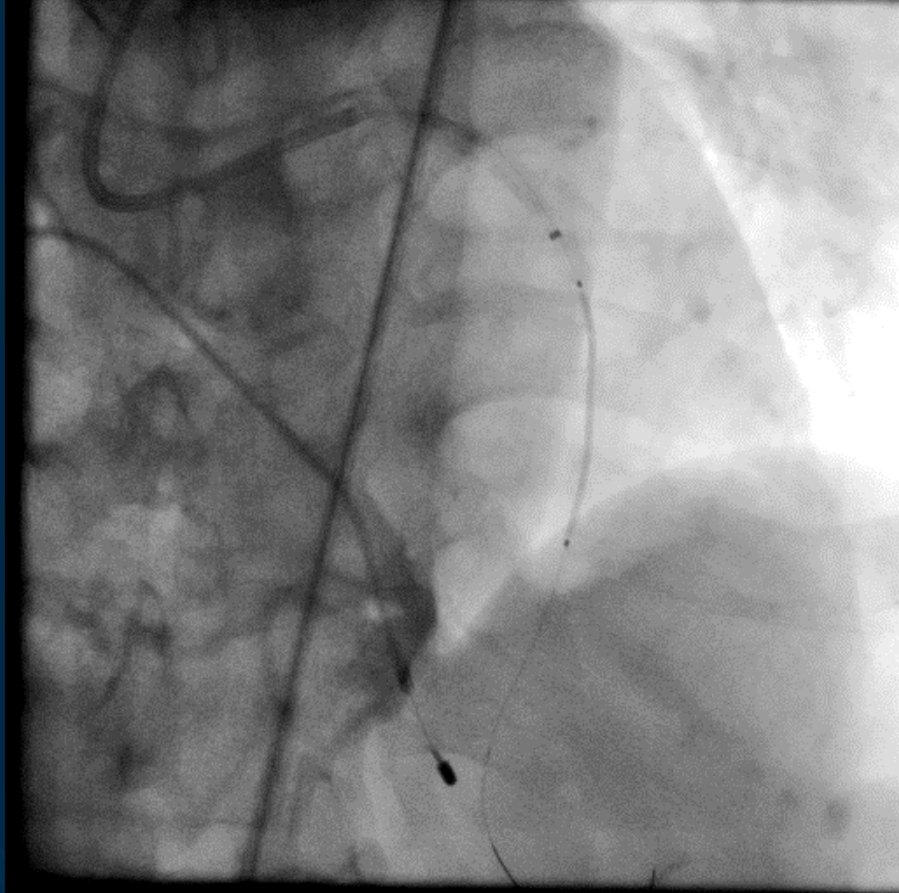
IVUS failed to cross

1.25-mm burr ablated from LM to mid-LAD at 180,000 rpm and then 130,000 rpm

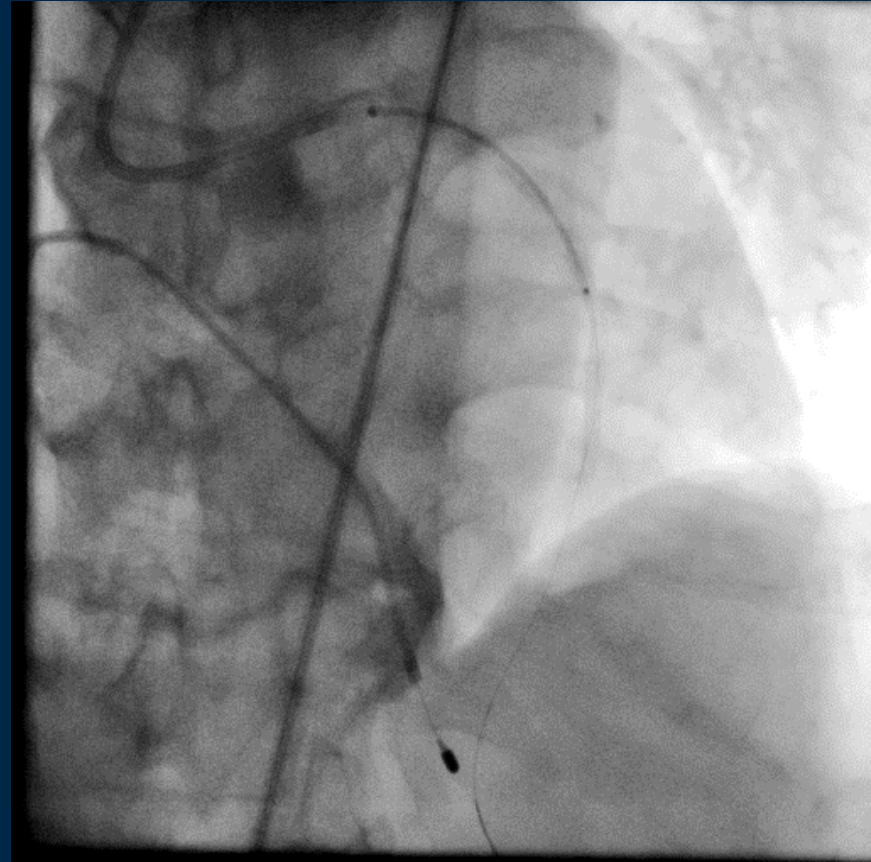


2.5 x 12 mm IVL

Angio after IVL

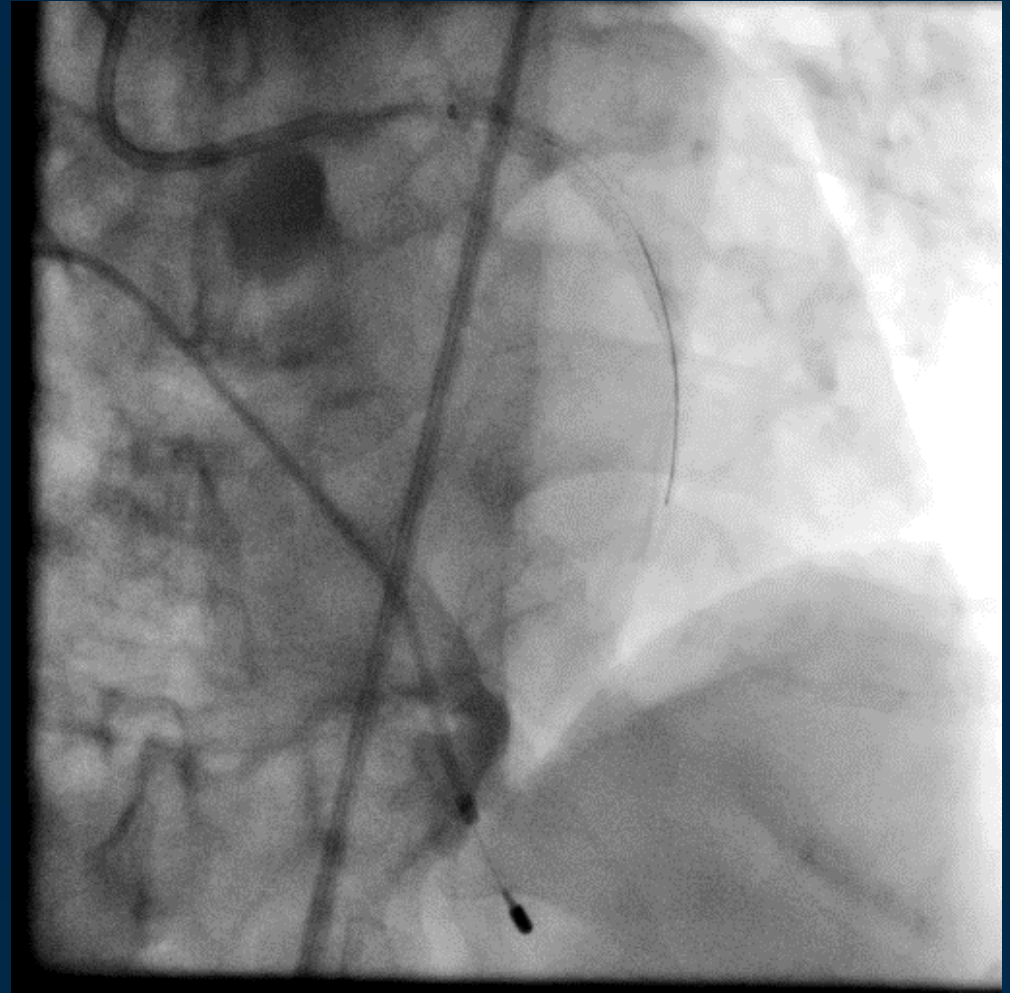


DES 2.25 x 38 mm

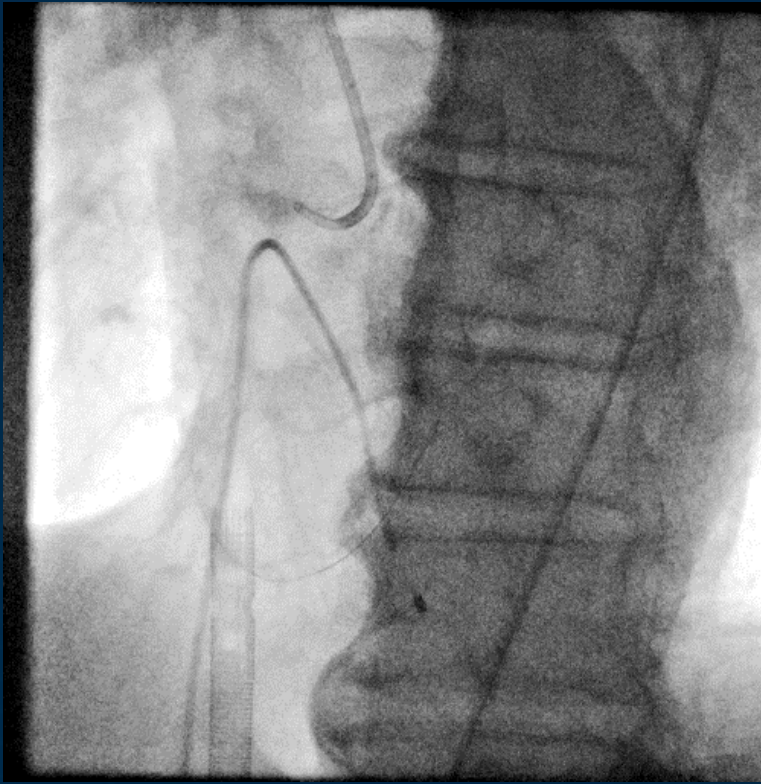


DES 2.75 x 38 mm
LM: POT 3.5 x 12 mm

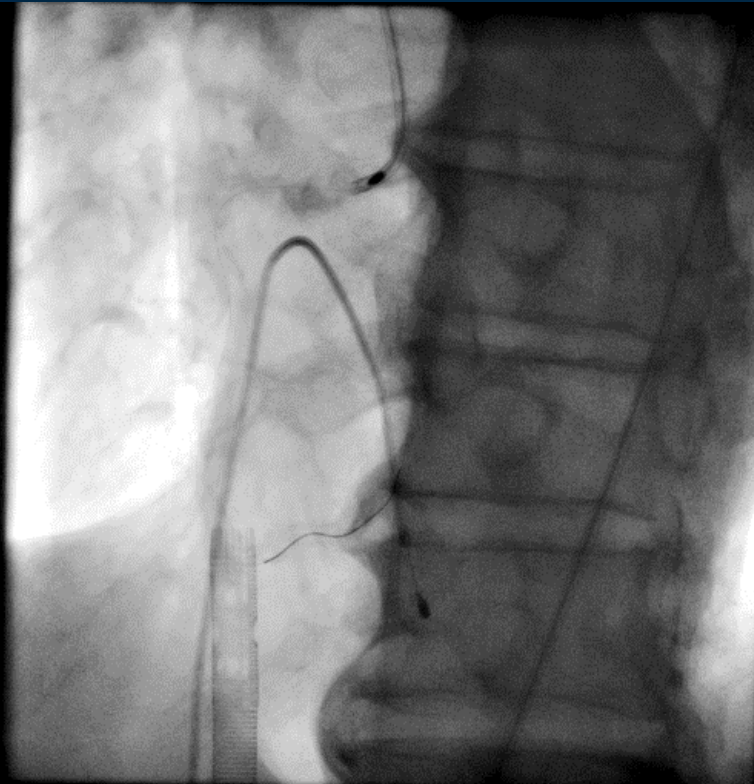
Final LAD angiographic results after 2 DES



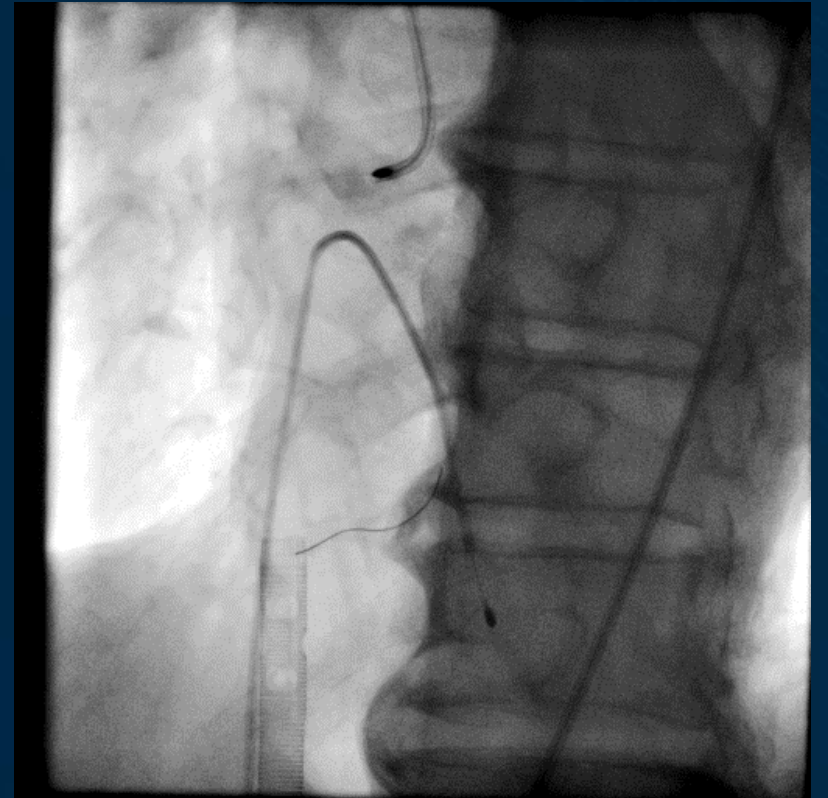
RCA ostium

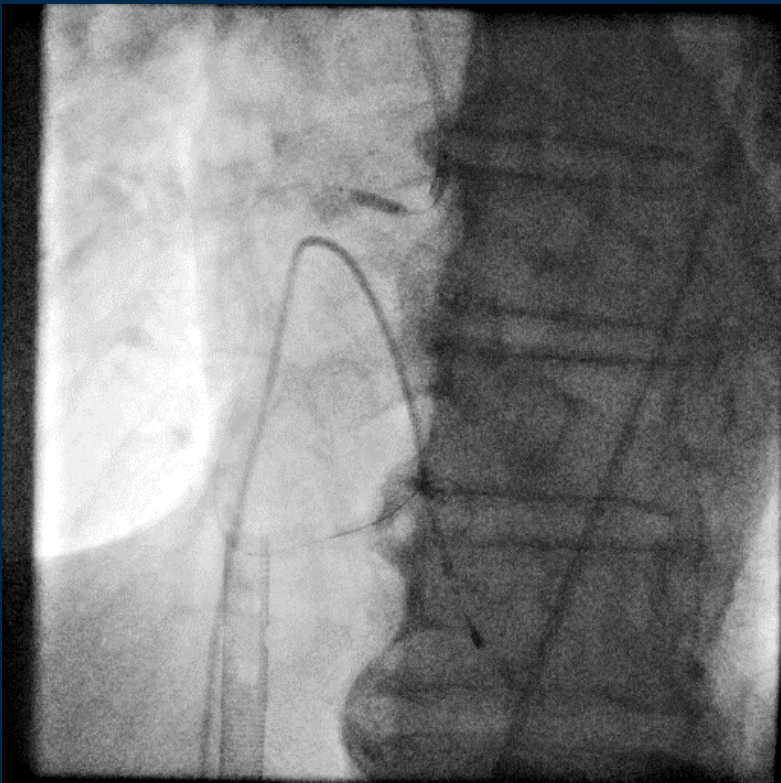


2.25-mm NC was pushed into RCA with Guidezilla cath, still undilatable

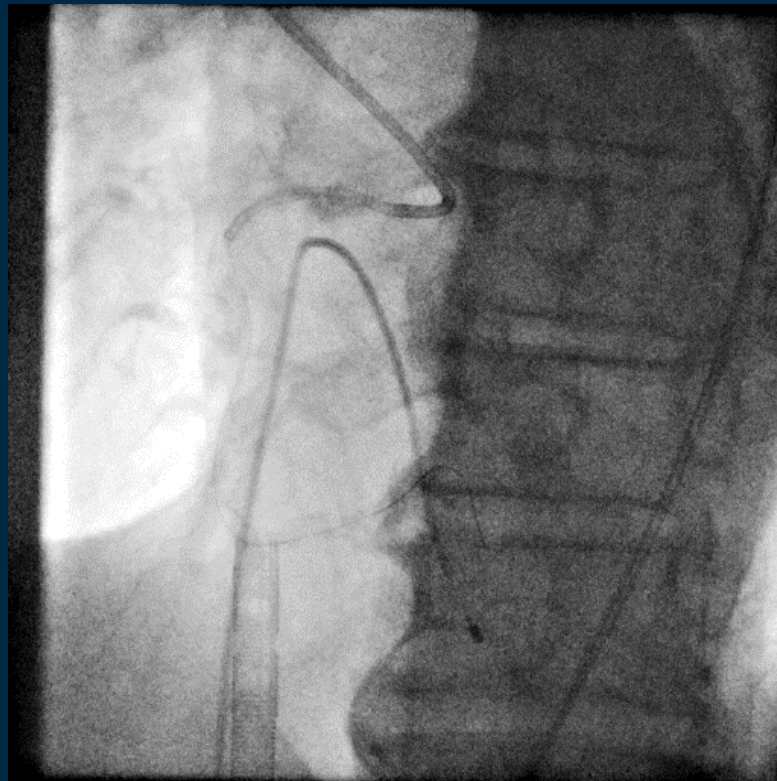


1.5-mm burr, after burr crossing the lesion, the patient developed marked hypotension and bradycardia

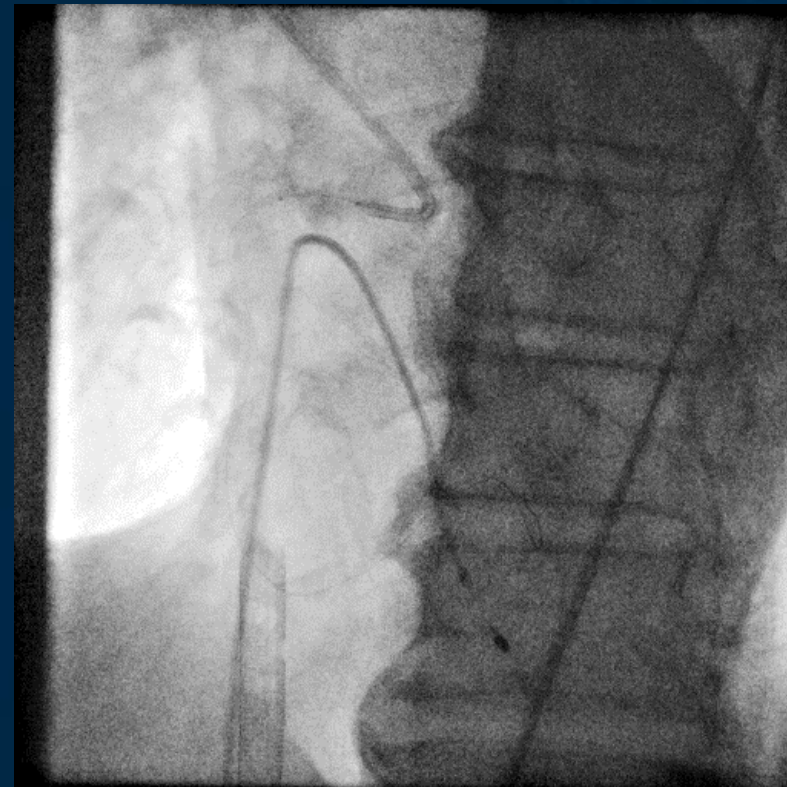




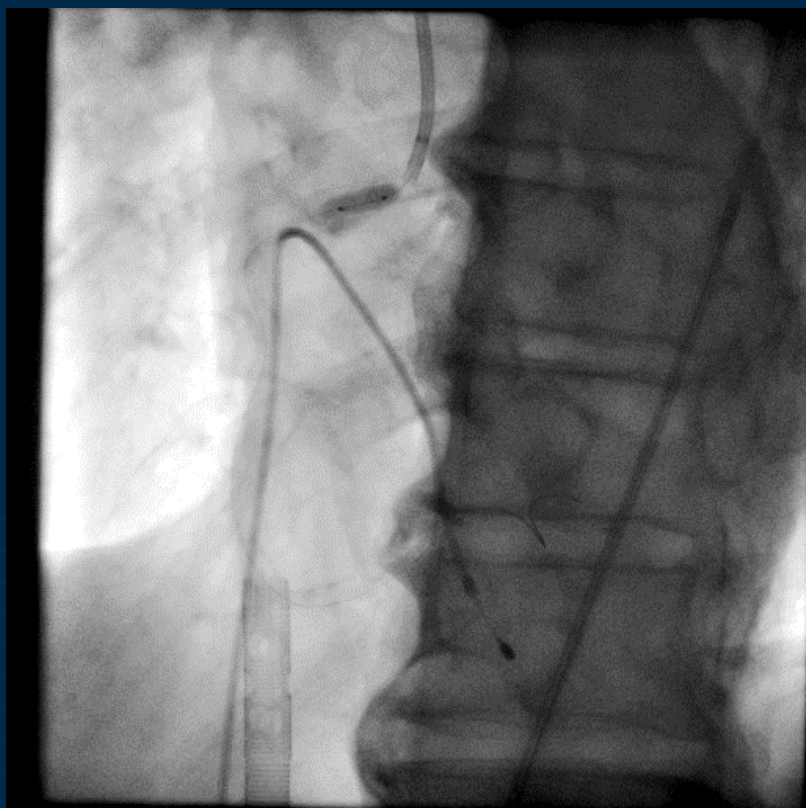
3.0-mm NC failed to cross



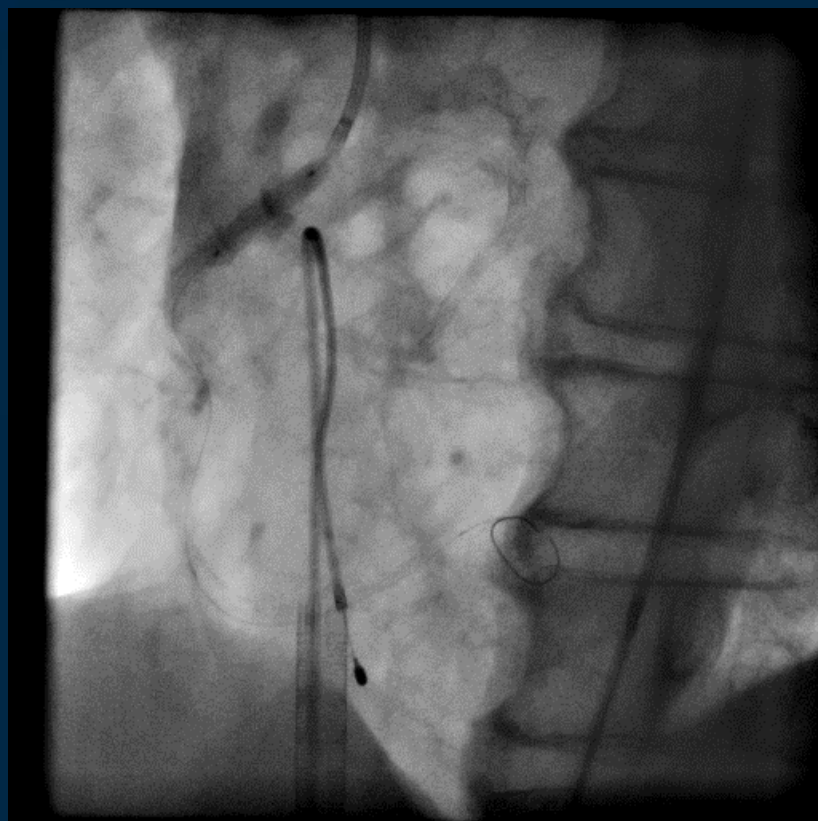
3.5 x 12 mm IVL balloon



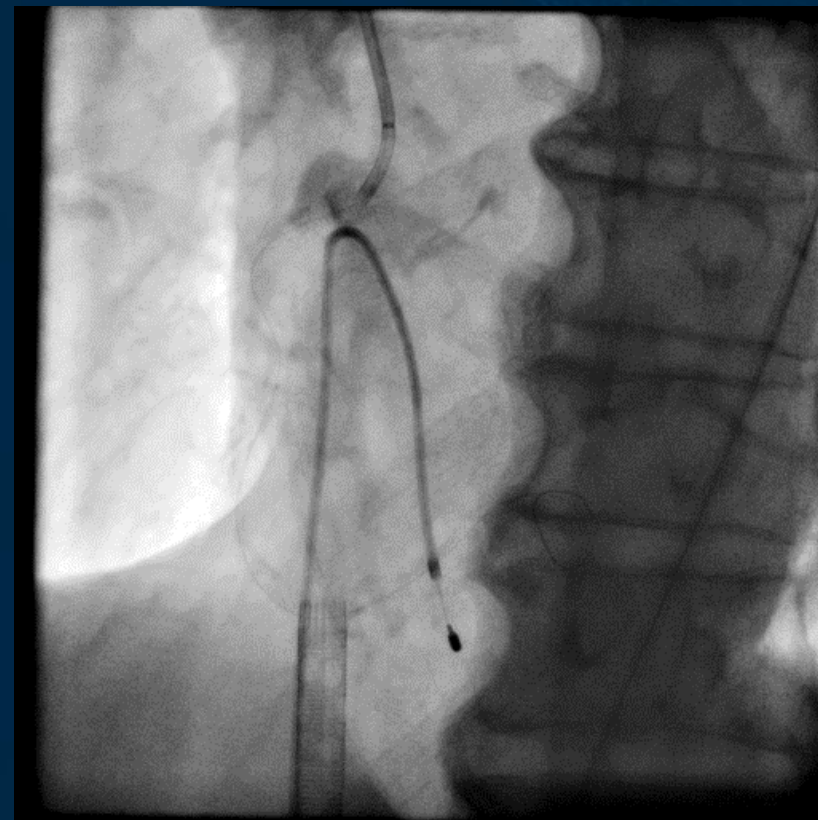
Shockwave



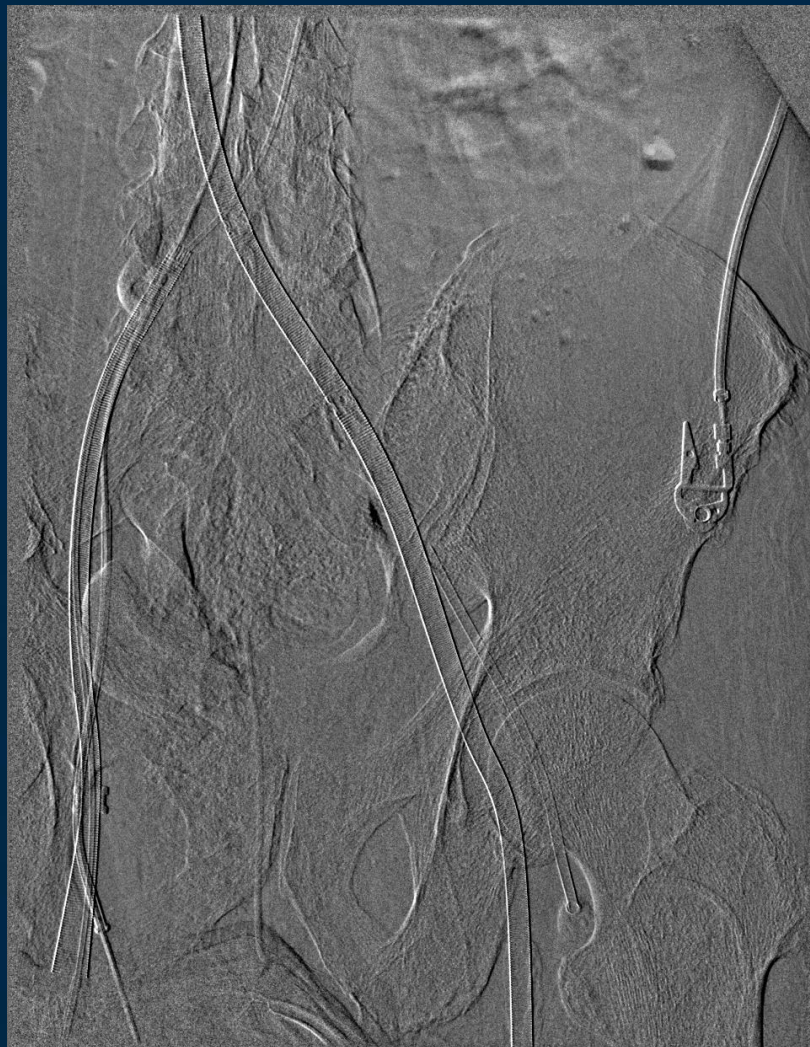
3.5 x 12 mm NC balloon
fully dilated the lesion



DES 3.5 x 16 mm

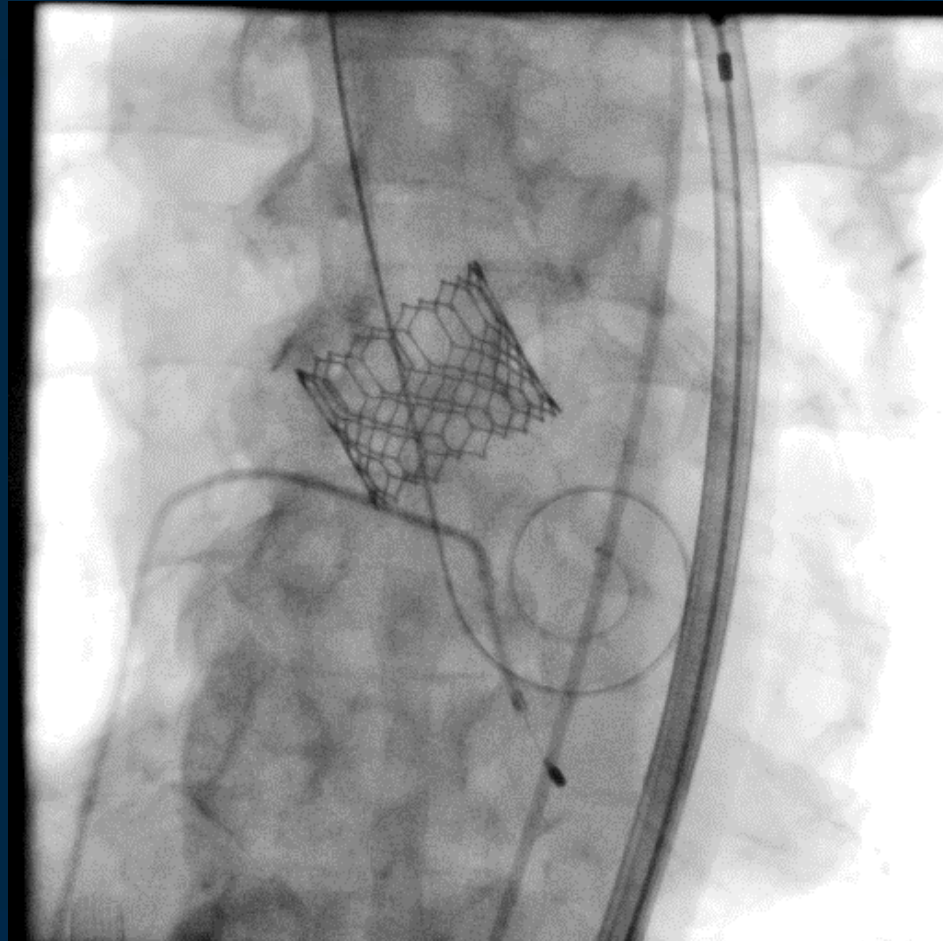
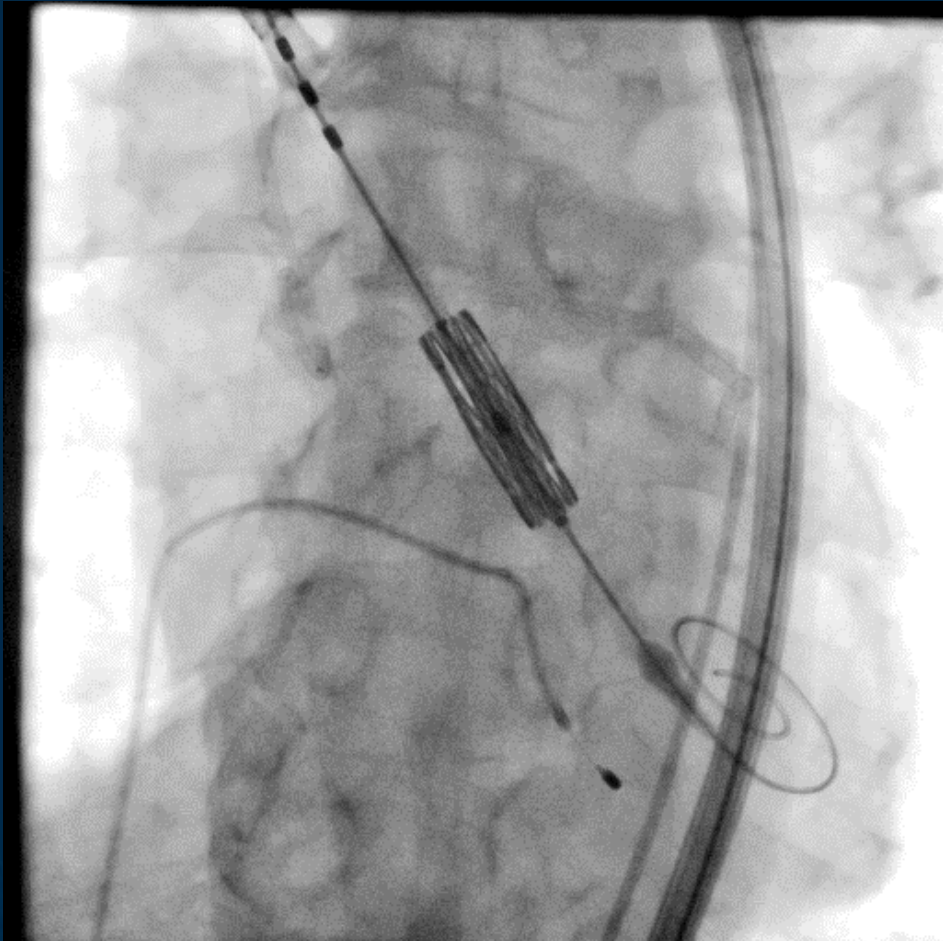


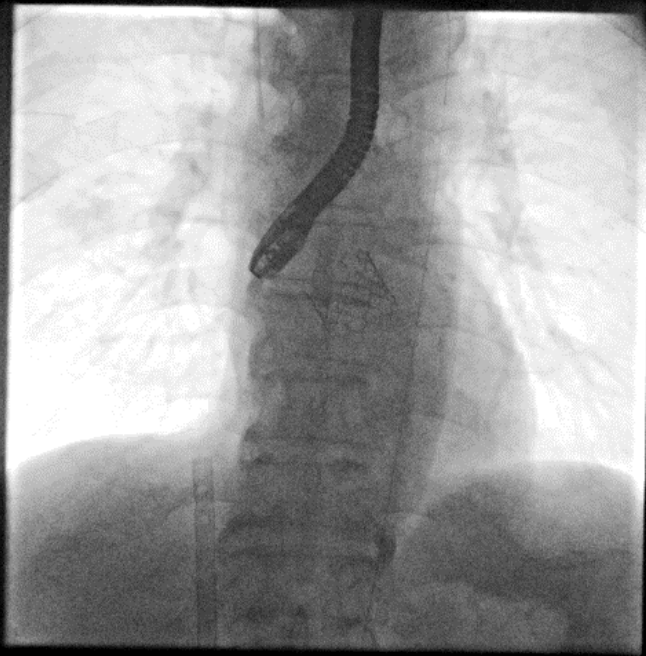
Final angiographic results



Angio. from left FA demonstrated some contrast extravasation and smaller caliber of FA, therefore, switched ECMO (15F) A cannula from Rt CFA to Lt CFA and TAVR via Rt CFA

S3 26 mm implantation

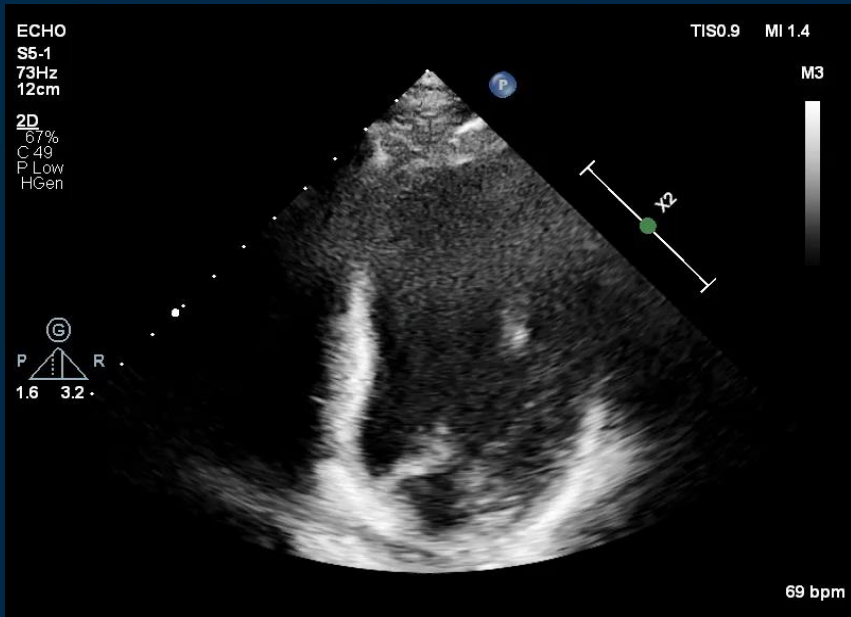




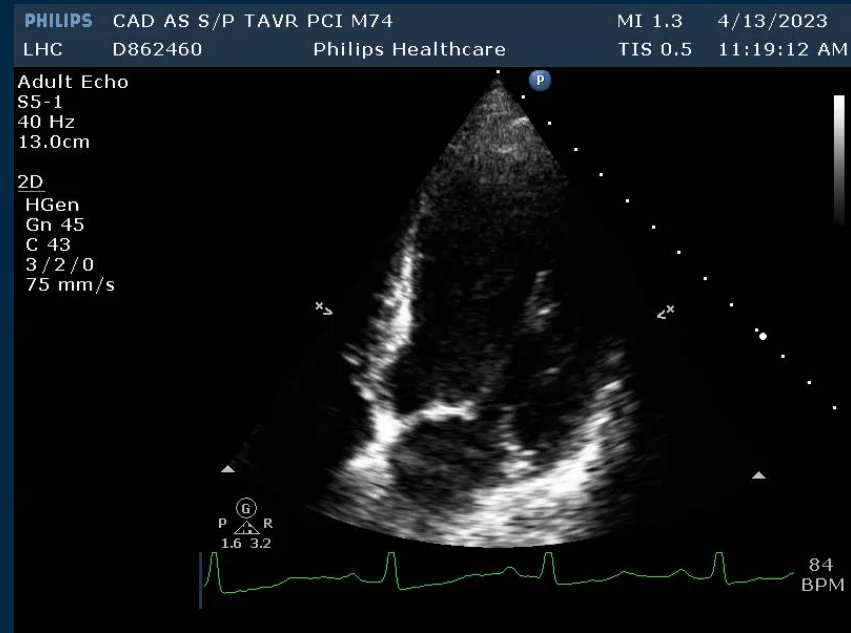
Removed ECMO right after TAVR and switched to IABP



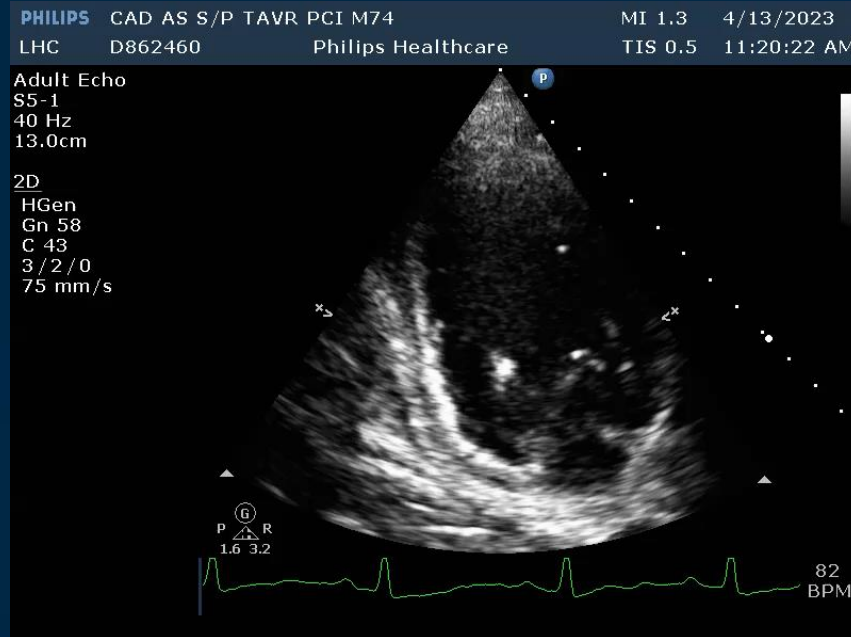
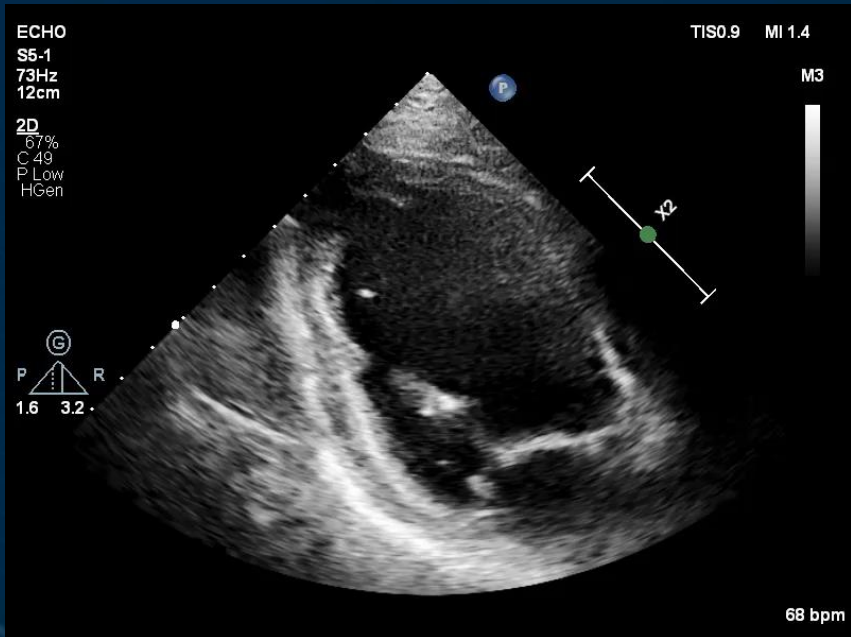
Lt CFA perforation (ECMO A cannula), managed with a Viabahn stent-graft



Pre-Procedure



Post-PCI and TAVR, the next day



IABP was removed at the next day following TAVR

Conclusion

- Vascular complication is the major cause of mortality in MCS patients esp. ECMO
- A recent study showed that the survival to discharge rates for patients on ECMO was 18% and 49% in patients with and without vascular complications
- A careful insertion technique can minimize adverse events and ECMO malfunction
- Close surveillance on the ECMO circuit, watch for vascular complications, and lab tests for hematological abnormalities are crucial for the prevention of ECMO related complications
- Short-term MCS may reduce the MCS related complications