

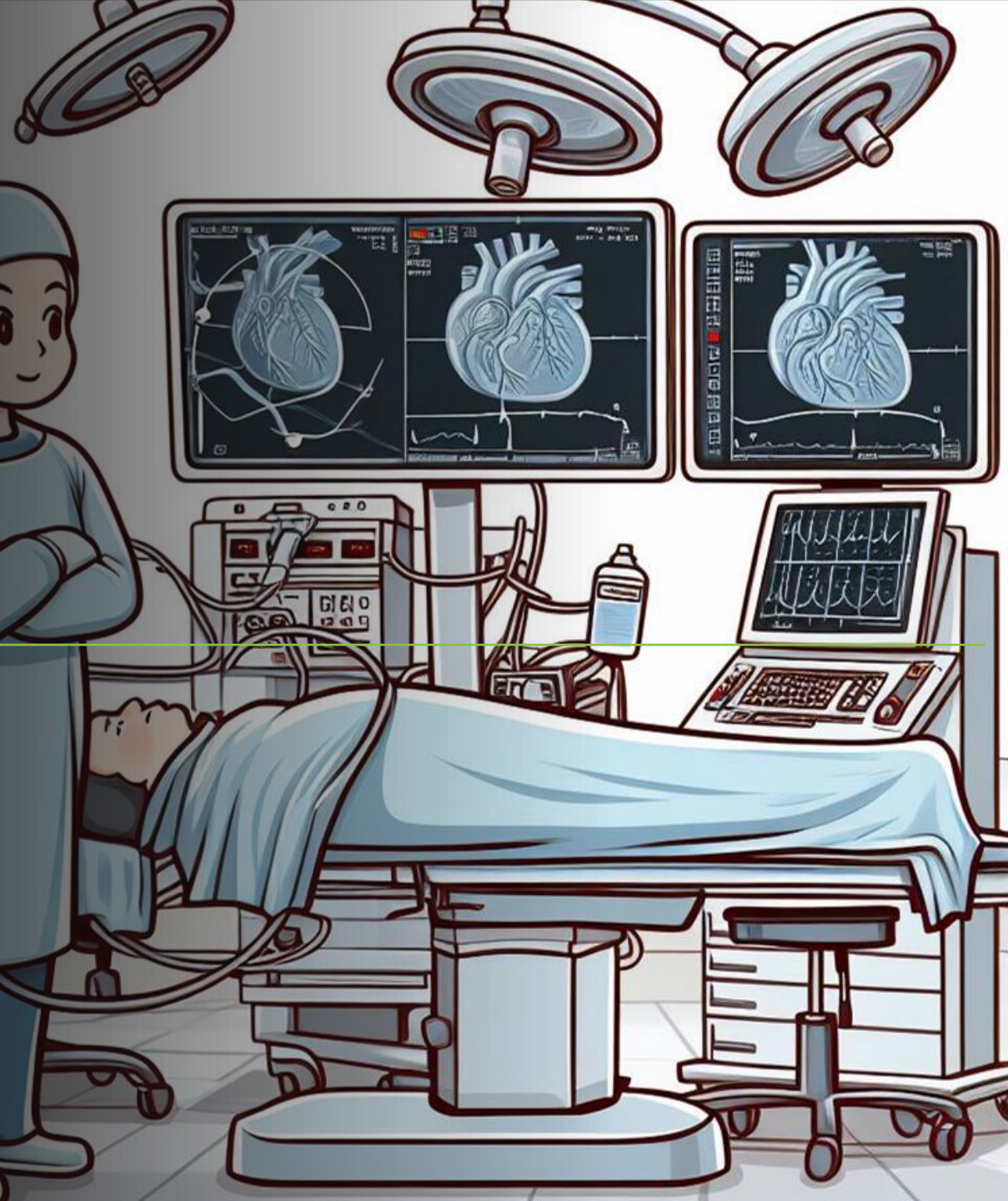
Tips and Tricks to Save Contrast in PCI

Dr. Anthony Yiu-Tung Wong

Honorary Clinical Assistant Professor, The University of Hong Kong

Consultant Cardiologist, Queen Mary Hospital, Hong Kong

Specialist in Cardiology, Hong Kong Sanatorium & Hospital



Definition

Ultra-low contrast volume: $< \text{CrCl}$

Low contrast volume: $\text{CrCl} - 3x \text{CrCl}$

High contrast volume: $> 3x \text{CrCl}$



Why Important?

- Reduce **contrast nephropathy**
- Contrast-associated coronary dissection
- Safer in hemodynamically unstable patients and those with active heart failure
- Pushing the limit for more complex PCI and hence **more complete revascularization**



Step 1 - Preparation

- Prepare your mind
- Be alert whenever facing high-risk patients
 - Underlying CKD
 - Unstable hemodynamics
 - In heart failure
 - Low LVEF
 - Old age
 - Low body weight
 - Fragile
 - Complex anatomy
 - CTO
- Always look for prior coronary angiogram if any

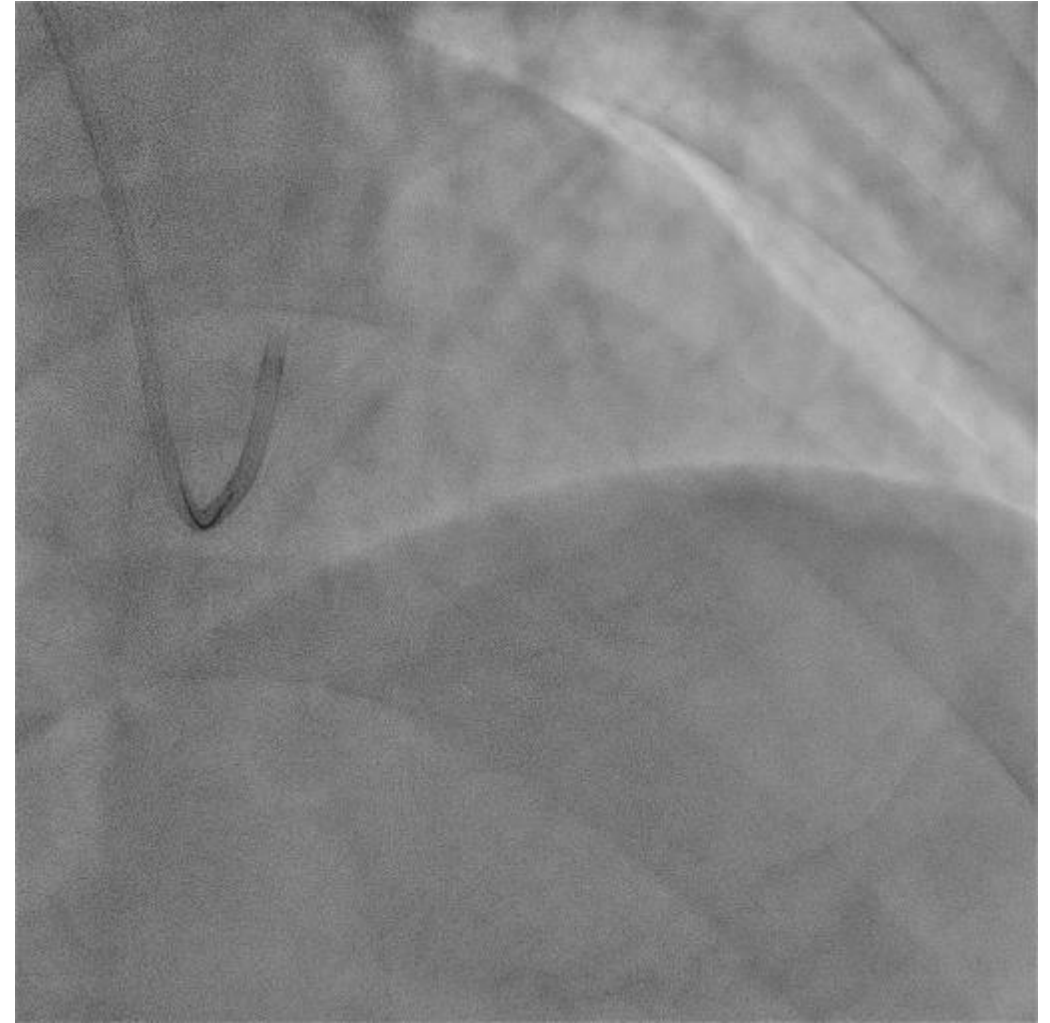
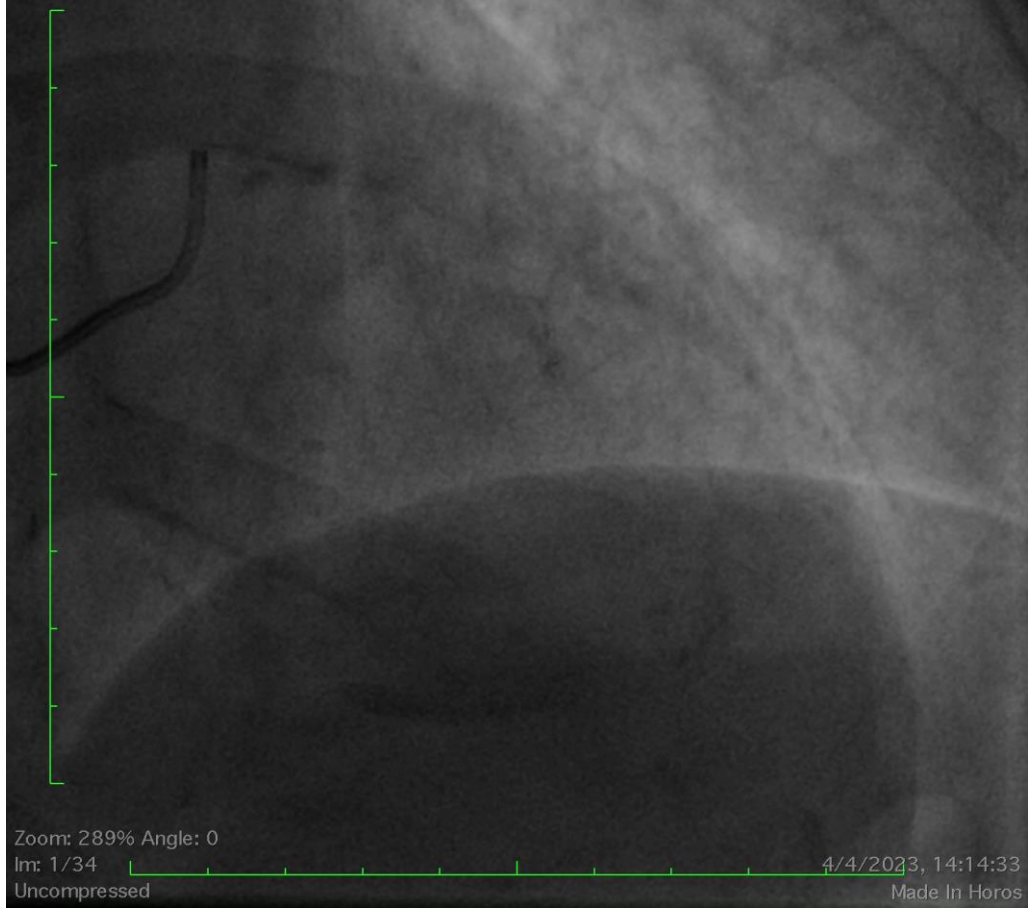
Step 2 – Coronary Guiding Catheter Engagement

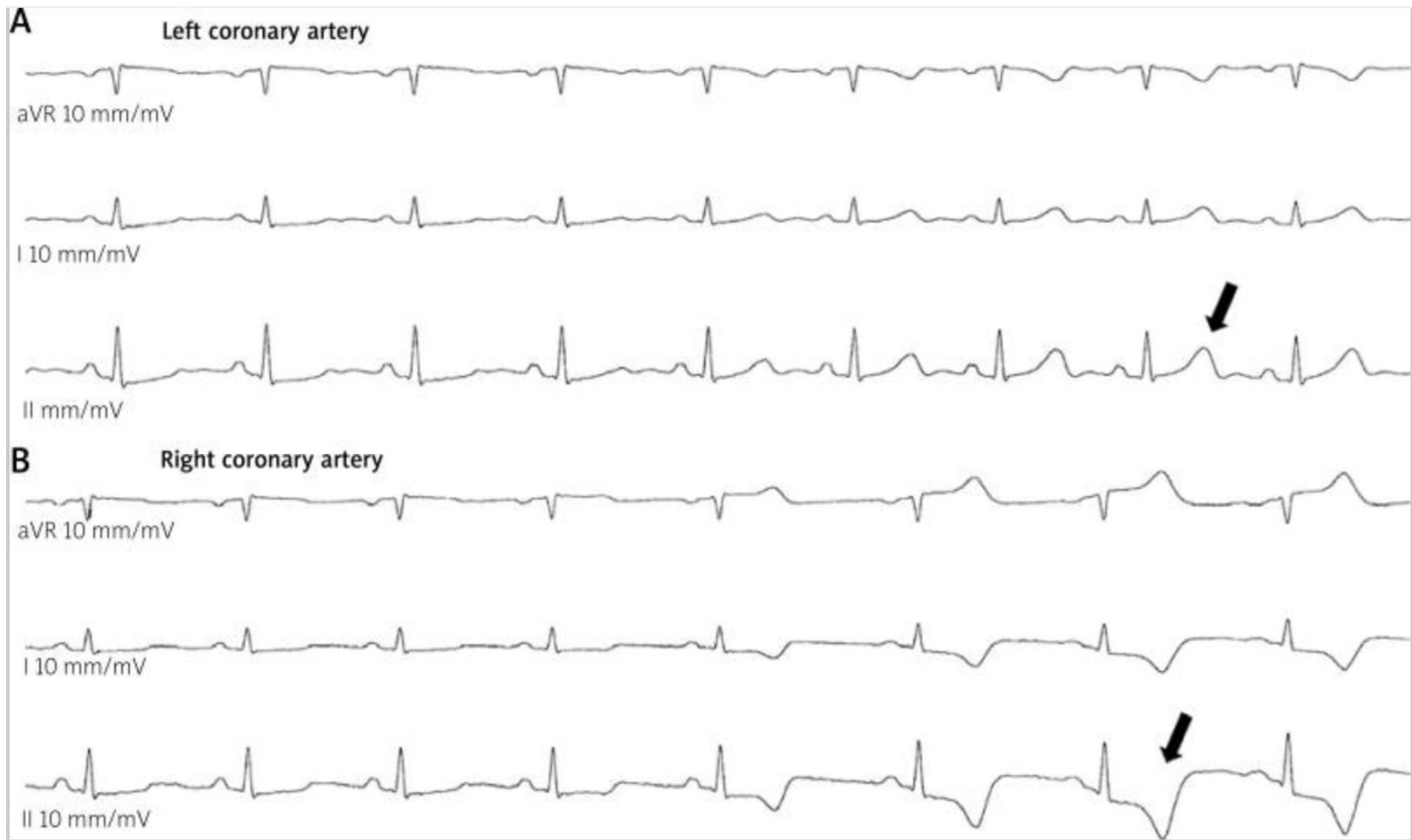
- Experience
- "Jump" into the ostium
- Look for coronary **calcium**
- Coronary calcifications "dancing" with guiding catheter
- Coronary wire should follow the typical coronary anatomy
- No side-hole guiding catheter should be used
- Flushing 10-20ml normal saline into coronary arteries induce ECG change



Image size: 512 x 512
View size: 1478 x 1478
WL: 128 WW: 189

D0905667 (71 y , 70 y)
Cardiac Cath
Cardiac 2
2





Step 3 – Baseline Coronary Angiogram

- Take GOOD BASELINE SHOTS of coronary angiogram
 - < 15ml contrast for both LCA (2 shots) and RCA (1 shot)
 - Done in **bi-plane**
 - Low magnification, or concentrate in the proximal vessels
 - **Avoid panning**
 - Use Coronary Roadmap function if available



Step 3 – Baseline Coronary Angiogram

- Create a “**mental picture**” in your brain
 - Try to memorize the important branches and segments with significant angulation
- Always withdraw the contrast staying in the catheters/tubing before administering drug or changing catheters
- Always fill up the guiding catheter with contrast before angiogram



Step 4 – Imaging Guidance

- Use of **high-definition intravascular ultrasound**
 - ABSOLUTELY ESSENTIAL
 - Give you a good picture of the intracoronary plaques, narrowing, distribution, etc
 - Do IVUS pullback in the main branch and **all** significant side branches
 - To determine the lesion preparation strategy and stenting strategy based on IVUS findings
 - **Angio-IVUS “co-registration” in your mind**, using branches and IVUS catheter as markers





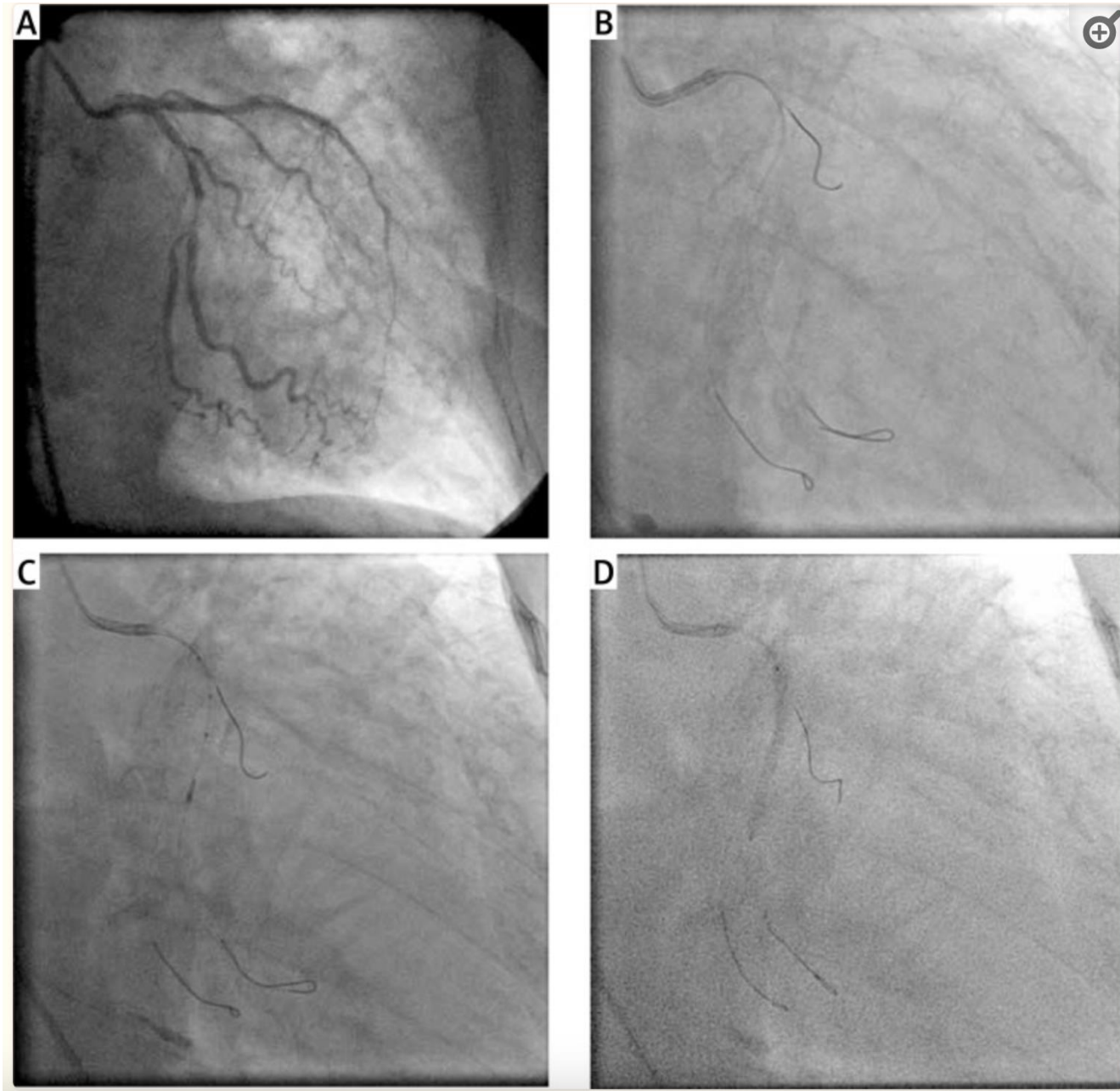
Step 4 – Imaging Guidance

- Use of resting physiology indices e.g. iFR or RFR pullback
 - Sometimes useful
 - Be careful if tight stenoses
 - Could “narrow down” the target of intervention and potentially make things simpler

Step 5 – Coronary Stenting

- Stenting position, size, and length **ALL** determined solely on IVUS findings
- **Refrained from** pre-check or post-check angiogram
- Use **side branch wires as markers**
 - Pay particular attention to the curve and movement of the coronary wires
 - **Precaution:** Shape and angulation of branches may change significantly after wiring (due to straightening of vessel with wires)
- Monitor for any chest pain, ECG changes or BP drop







Step 6 – Optimization

- Post-stenting and post-optimization IVUS
 - ABSOLUTELY ESSENTIAL
 - Look carefully to detect any complication, under expansion, under sizing, etc → optimize accordingly
 - Consider post-stenting iFR/RFR pullback

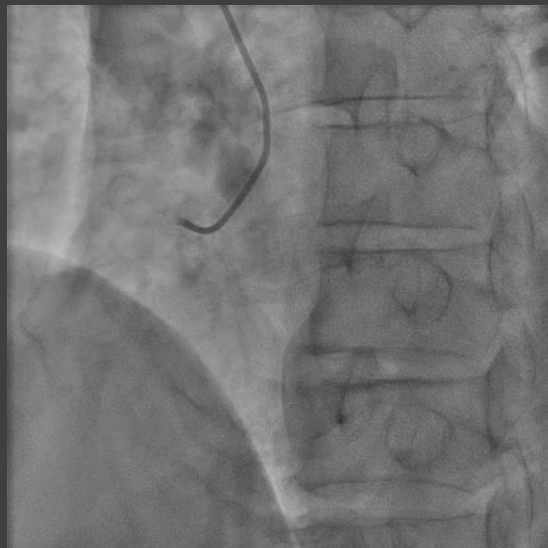
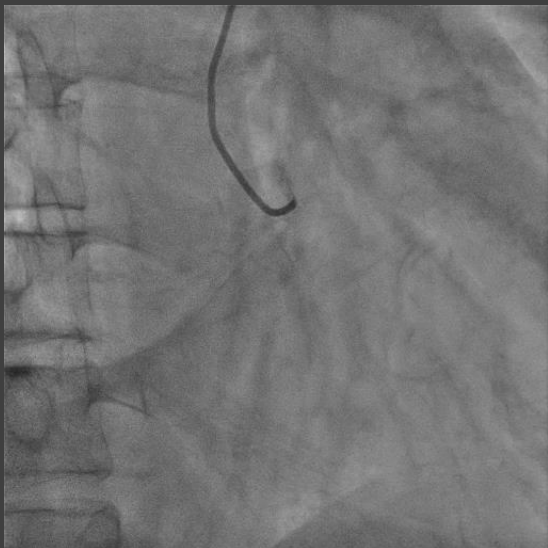
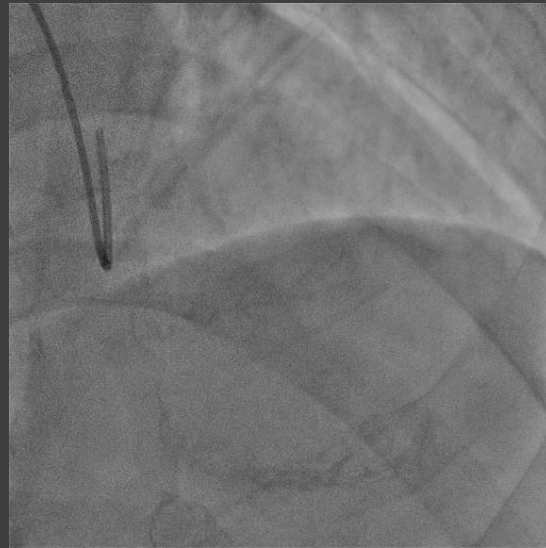
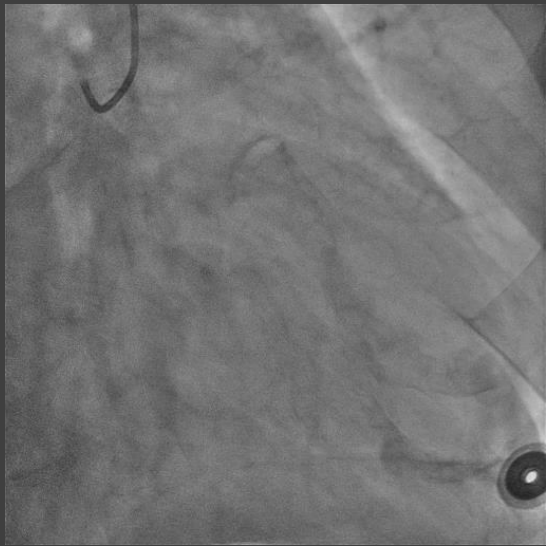
Step 7 – Final Angiogram

- Perform **one good** post-PCI angiogram shot to detect complications
 - Distal wire perforation
 - Side branch occlusion
 - Ostial LM/RCA or aortic dissection
 - For documentation

Case Illustration

Case

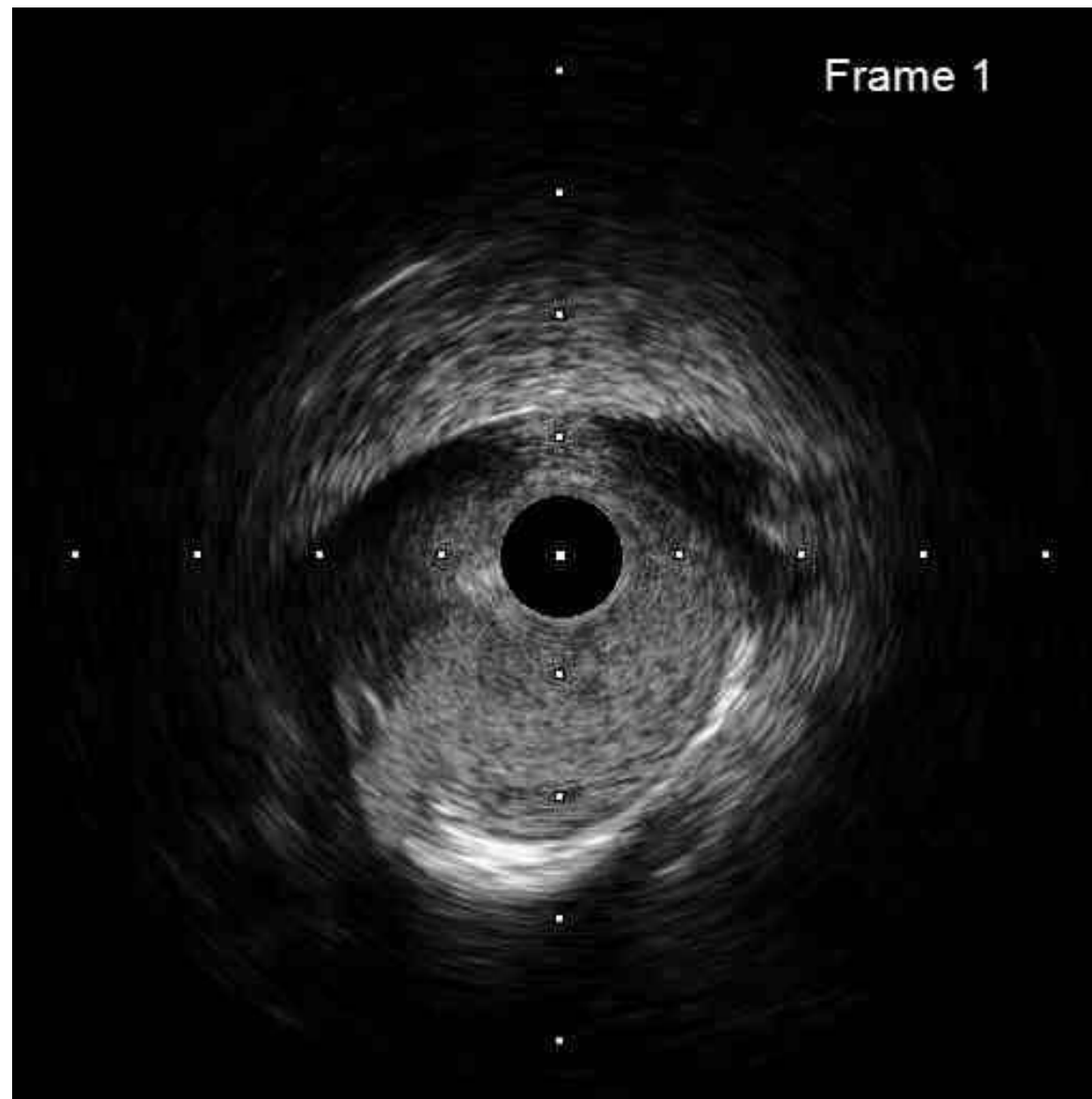
- M/78
- Hypertension, hyperlipidemia, diabetes
- DM nephropathy
- Creatinine 520 $\mu\text{mol/L}$, eGFR 10 mL/min/1.73m²
- Admitted for unstable angina for 2 days
- Patient still not keen for dialysis for the time being
- Discussed with renal physician, advised conventional coronary angiogram +/- percutaneous intervention using minimal contrast

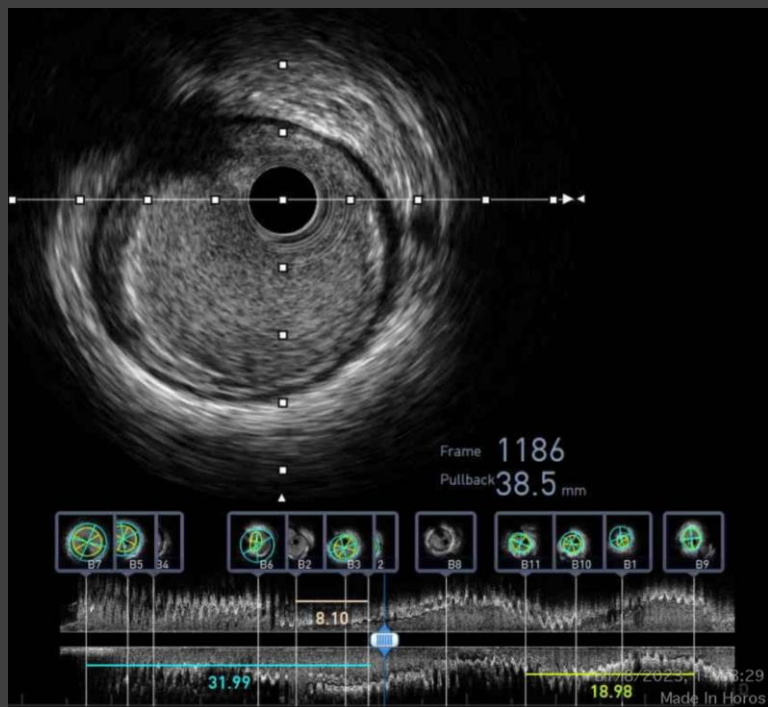
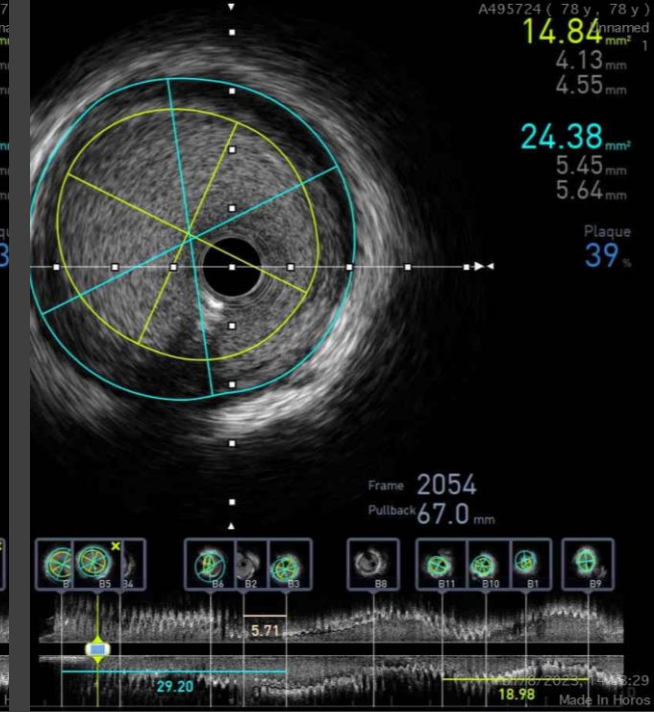
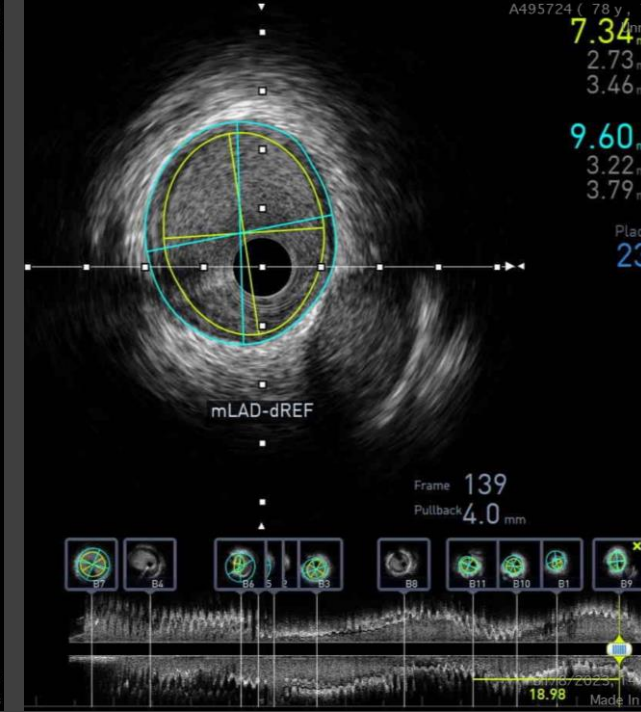
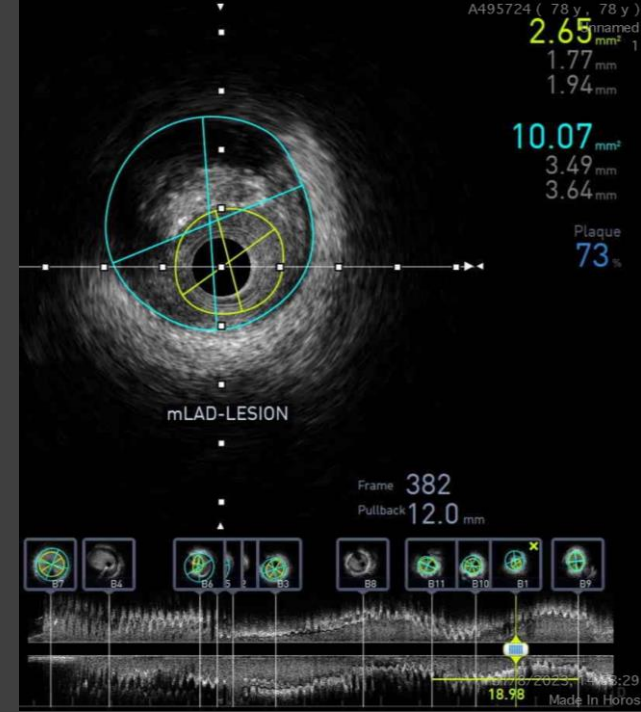
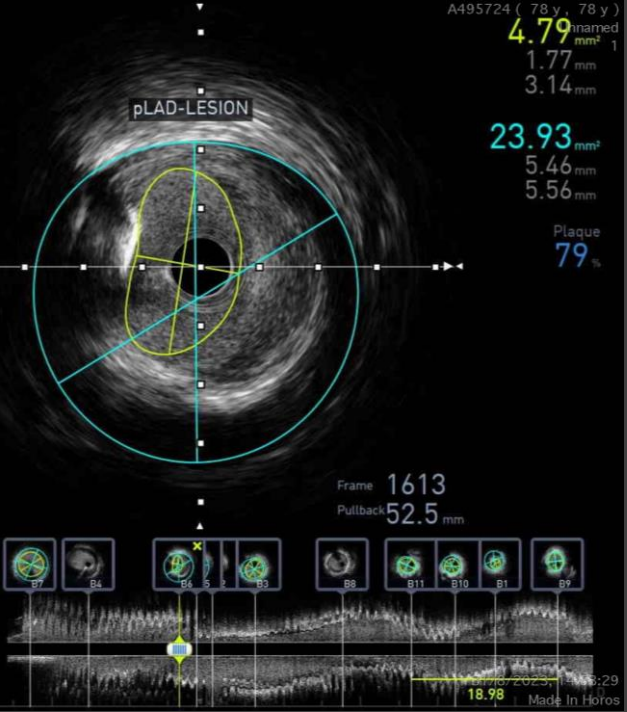


Coronary Angiogram

- 78 y/o Unstable angina
- <15ml contrast used

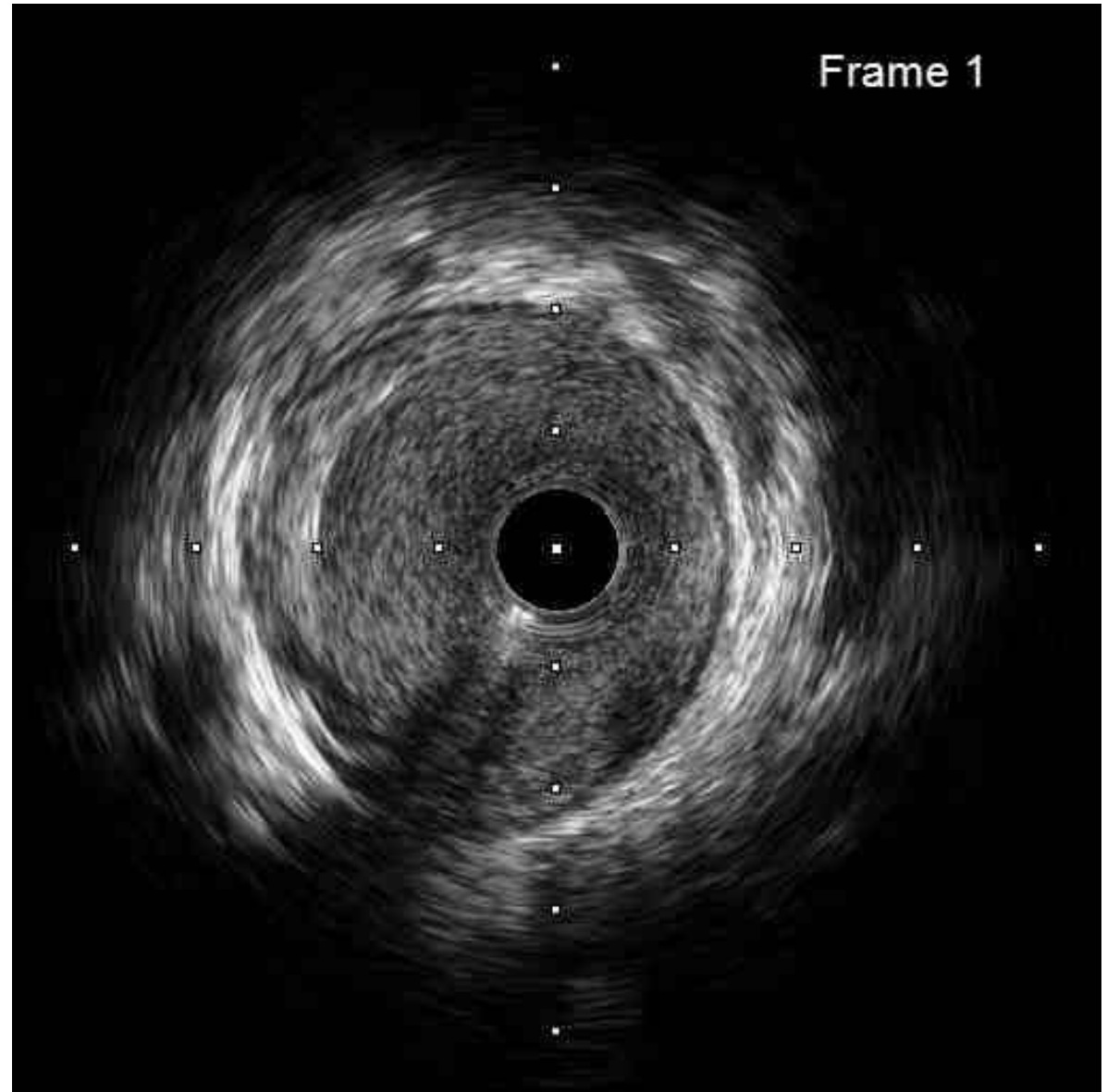
Baseline IVUS



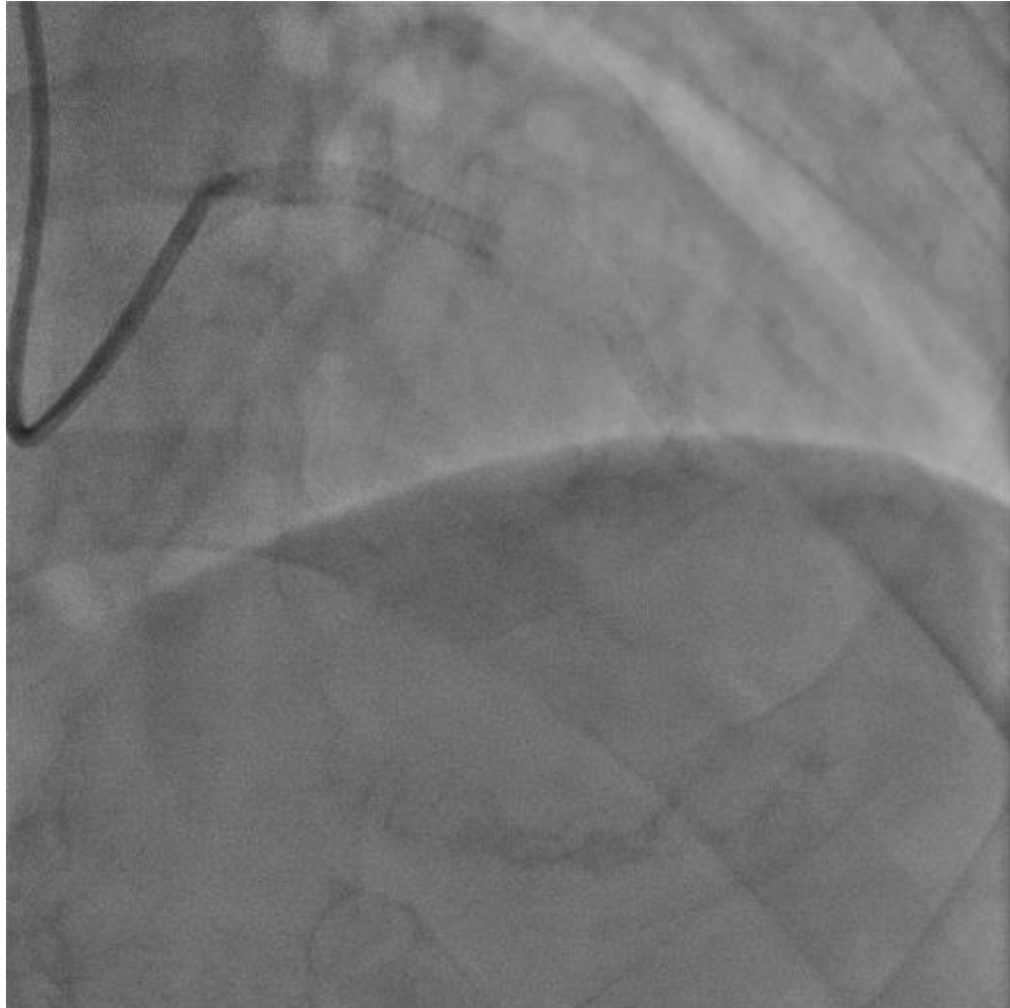


Strategy Based on IVUS

Final IVUS



Final Angiogram



Total contrast use (coronary angiogram + PCI) = 30ml
Patient's RFT stable post-PCI → no need for dialysis



Conclusion



ALWAYS BE VIGILANT TO
SAVE CONTRAST IN PCI



IMAGING GUIDANCE IS
ESSENTIAL



PRACTICE MAKES
PERFECT!