Functional Assessment Is It Necessary in CHIP-PCI?

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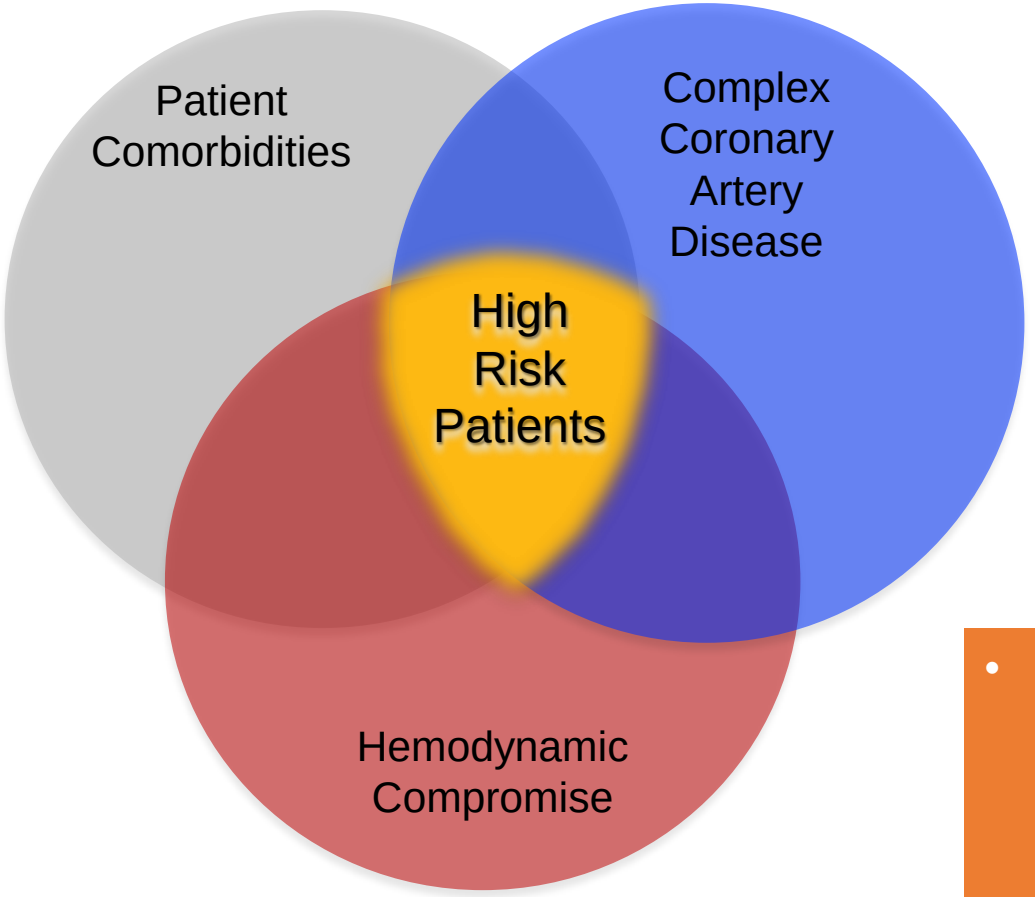
Disclosure

I, [Lei Song] DO NOT have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.

Complex Higher-Risk and Indicated Patients

Diabetes, advanced age, peripheral vascular disease, unstable presentation, prior/inelegible cardiac surgery



High Syntax score
CTOs
Heavily calcified lesions
(bifurcations, CTO)

Low LVEF
Extensive ischemia

- Physiology Assessment
  - Understanding the lesion
  - Deciding appropriate strategies
  - Minimize the contrast using
  - Optimizing the results

Viewpoint 1

I can complete a CHIP PCI without physiology guidance !

WRONG !

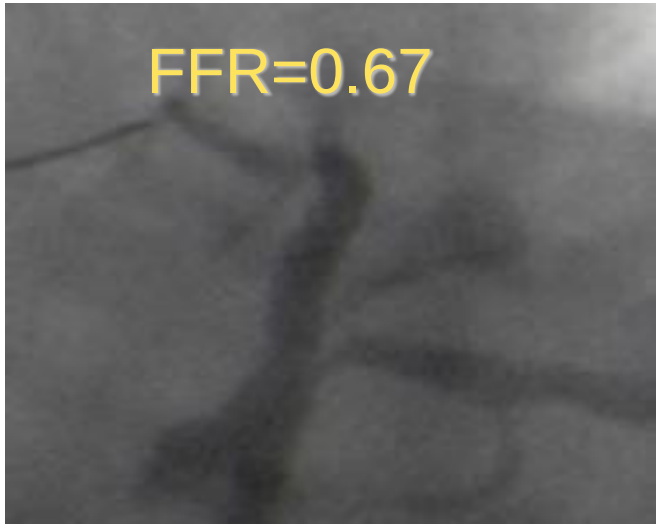
CHIP cases have more complex anatomy

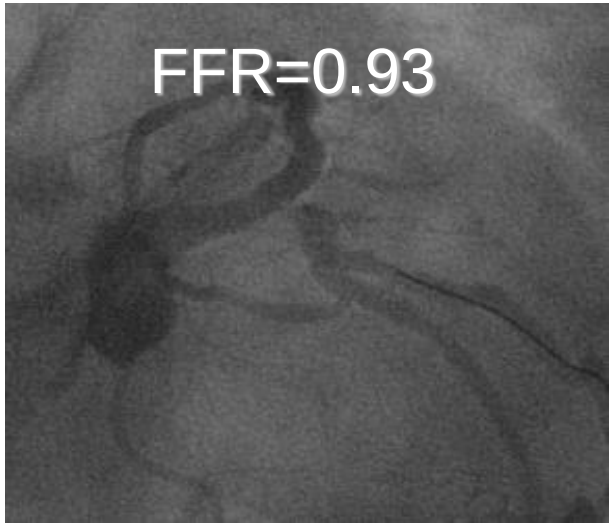
i.e. bifurcation, left main, restenosis, CTO ...

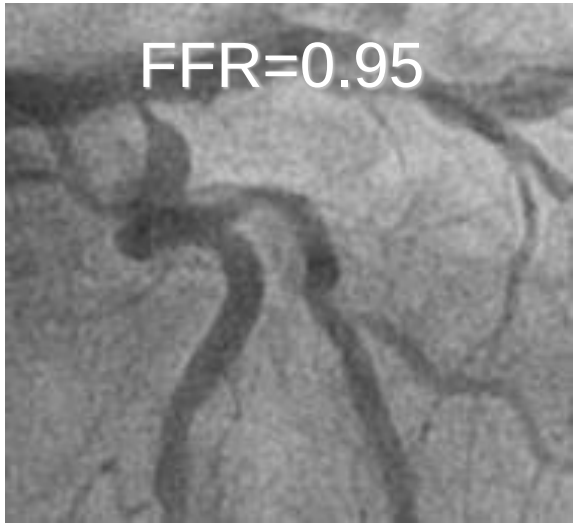
Complete ≠ Good results

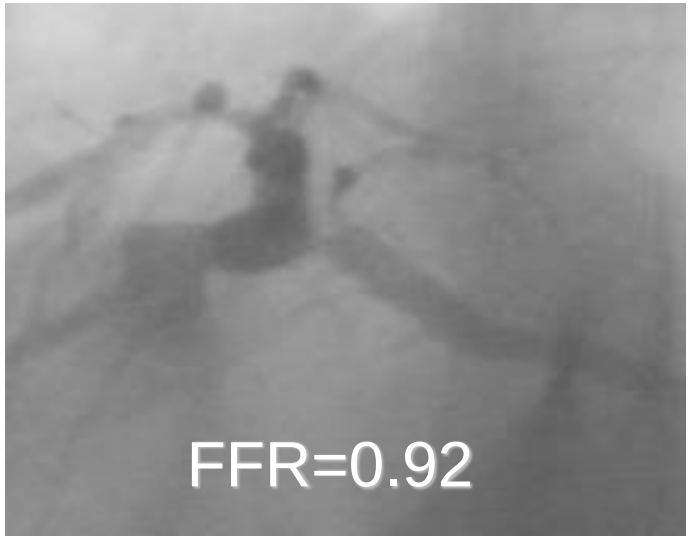
Optimized results should be the target, associated with better long-term outcome !

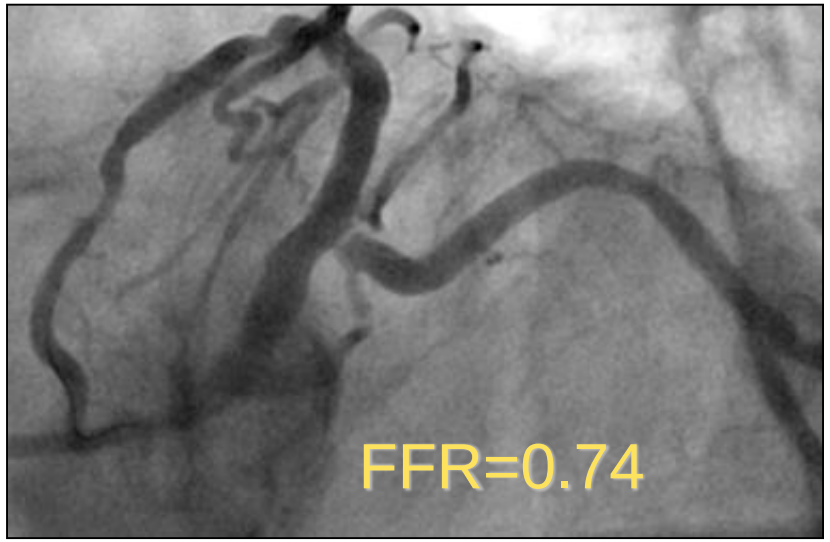
Physiology assessment simplify the bifurcation PCI strategy







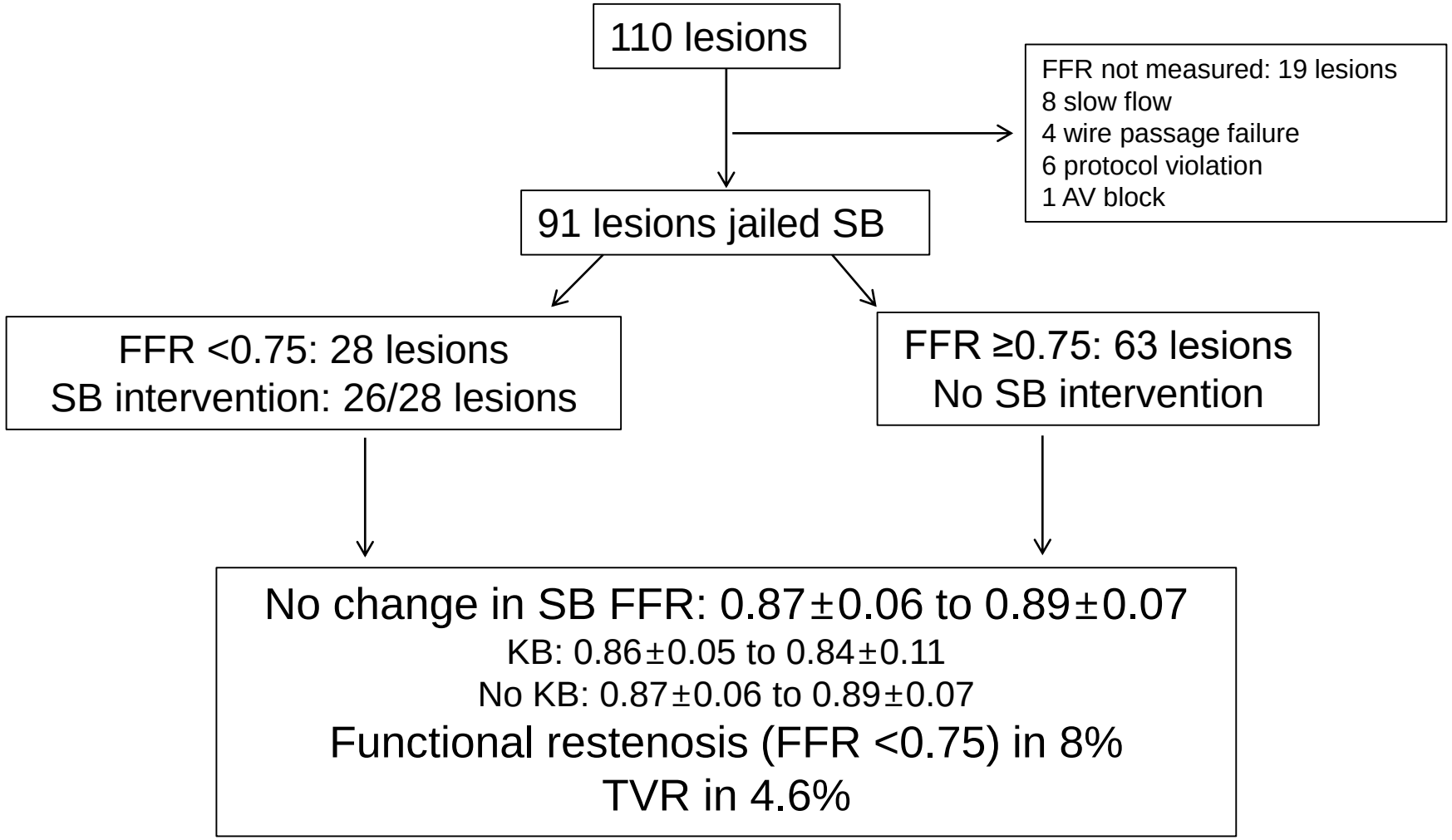




Courtesy of Dr Colombo and Dr Airoldi

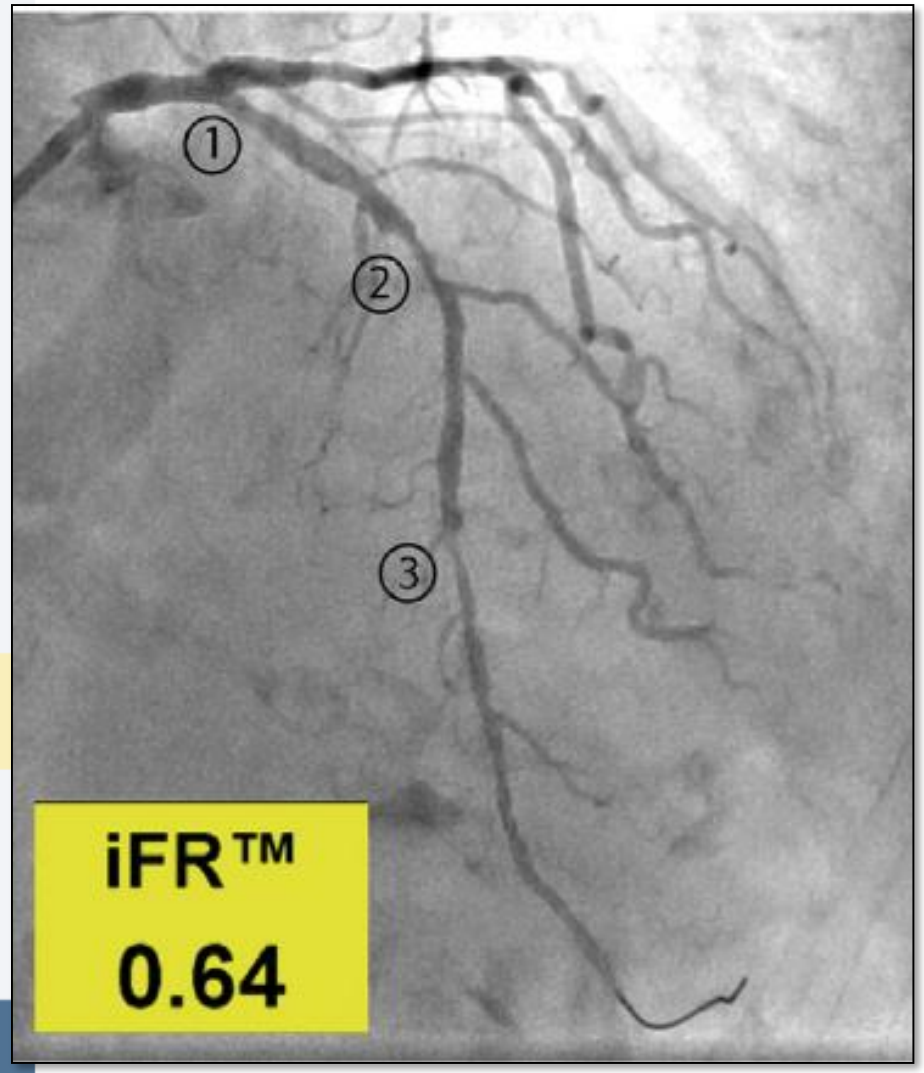
Treatment for Jailed SB with Normal FFR

SB FFR >0.75 is safe for deferral in non-LM disease

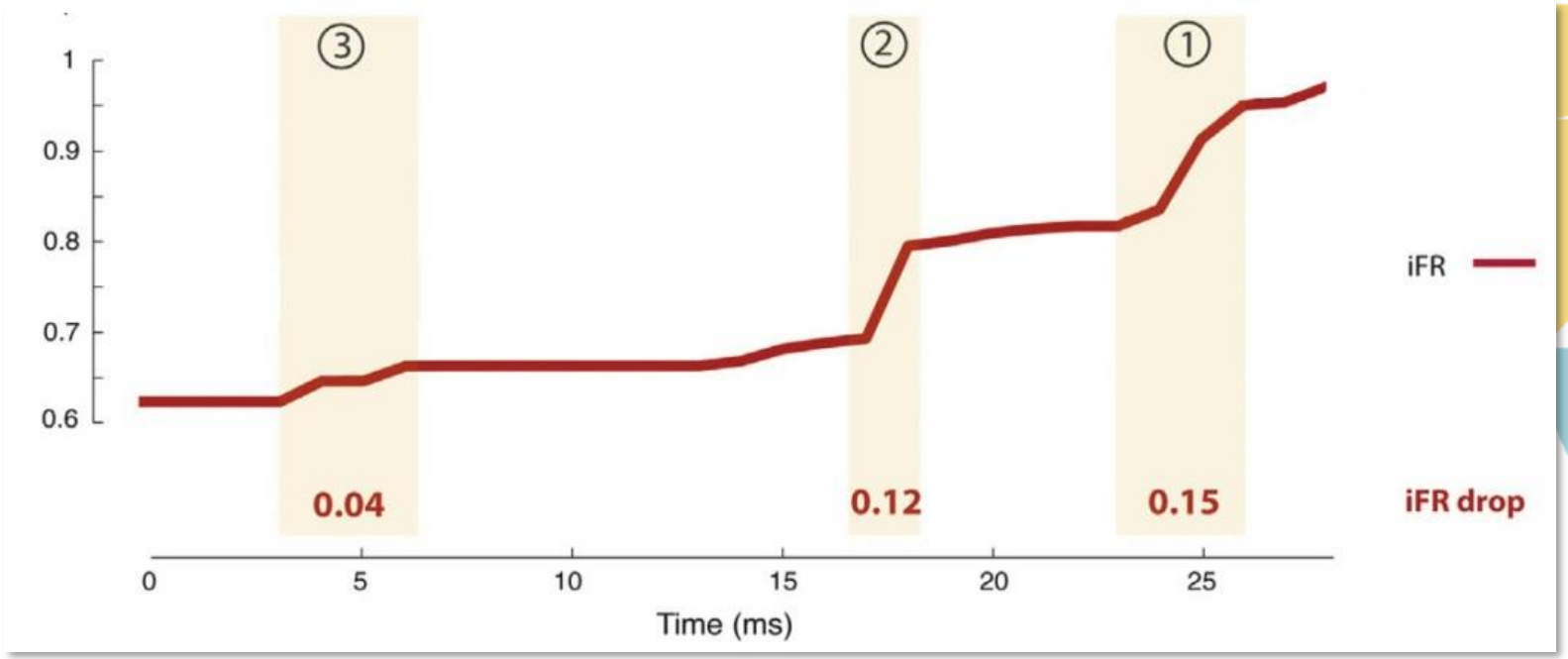


Koo et al. Eur Heart J 2008;29:726-32

How to plan PCI for diffuse lesion



- Where should the stent be placed ?
- How many stents are need?
- Was normal blood flow returned?



Kim, H-L, et al.; JACC:Cardiovasular Interventions;5(10) 2012, 1013-1018

Viewpoint 1

I can complete a CHIP procedure without physiology guidance !

Complex case benefit more from physiology guidance !

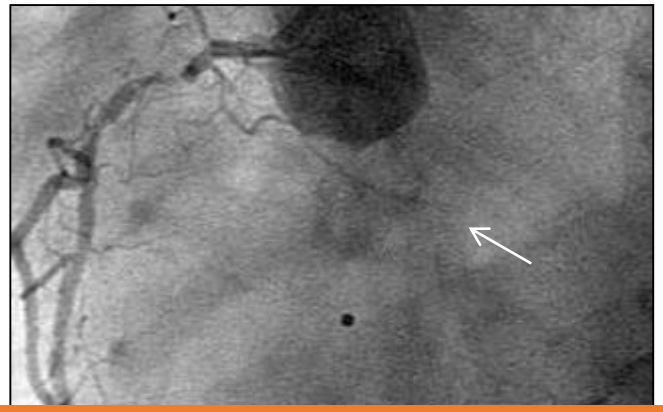
Viewpoint 2

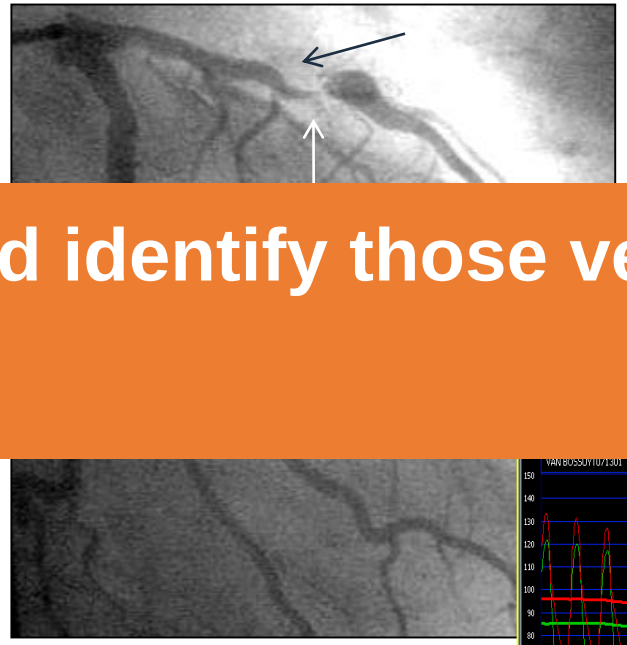
CHIP with unstable hemodynamics,

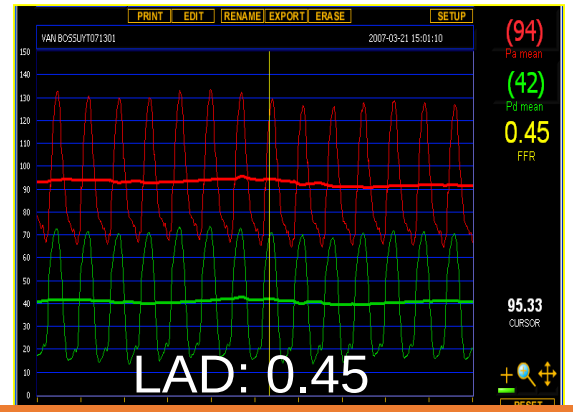
no time to perform the physiology assessment !

WRONG !

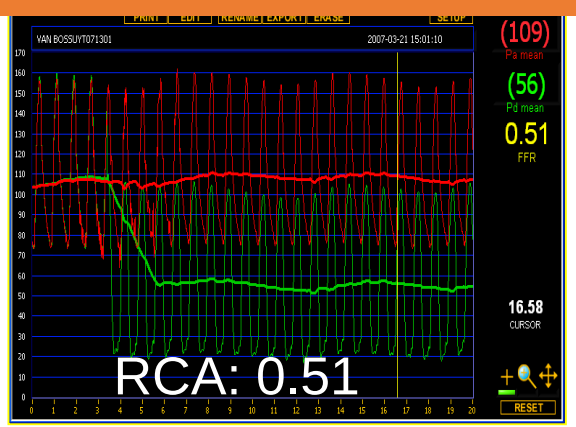
79 y/o female with diabetes, CCS 3-4 angina

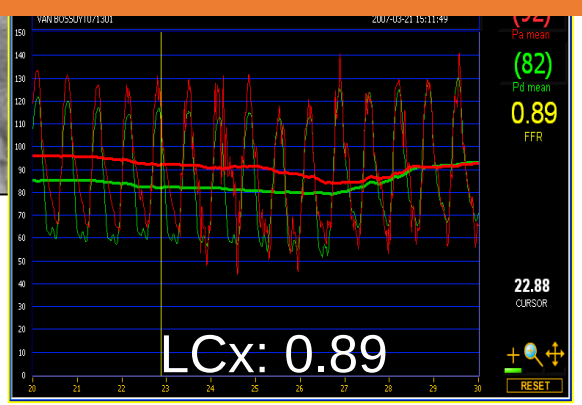






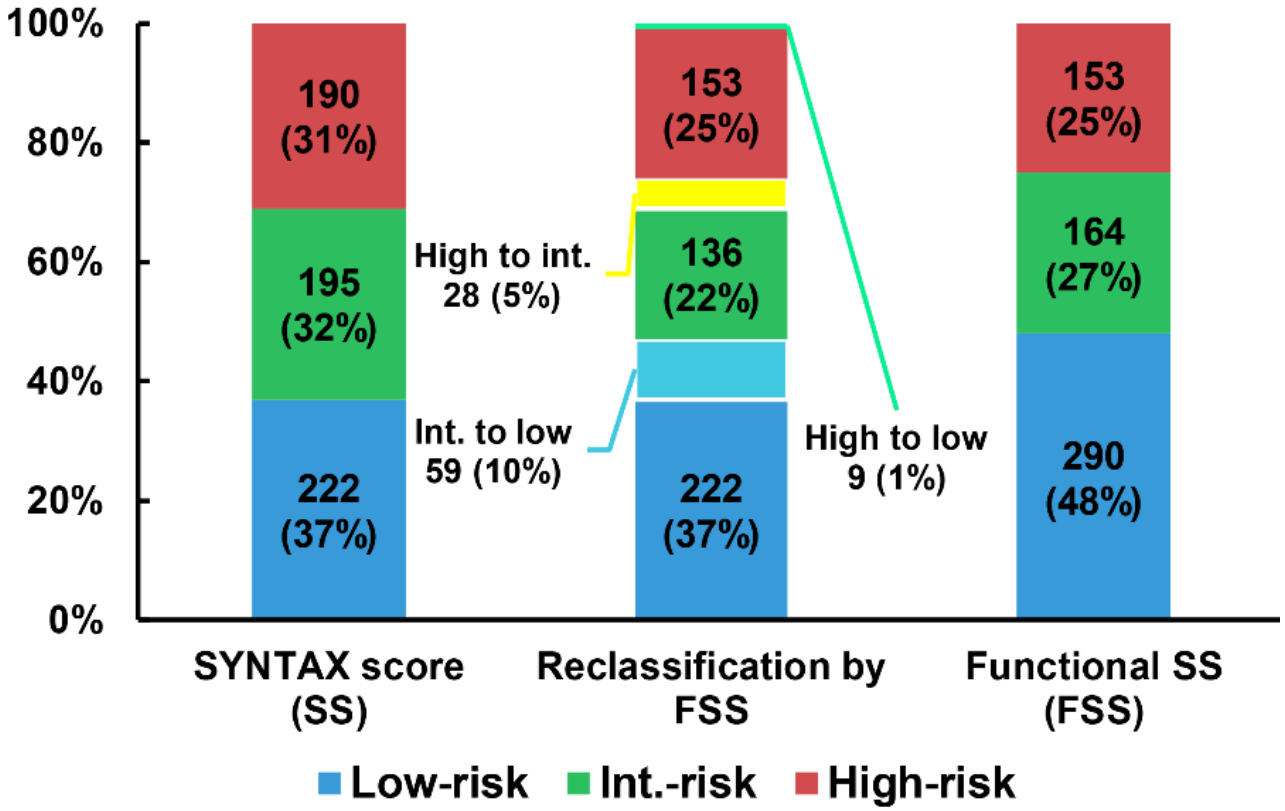
Physiology assessment could identify those vessels truly need revascularization, or not !

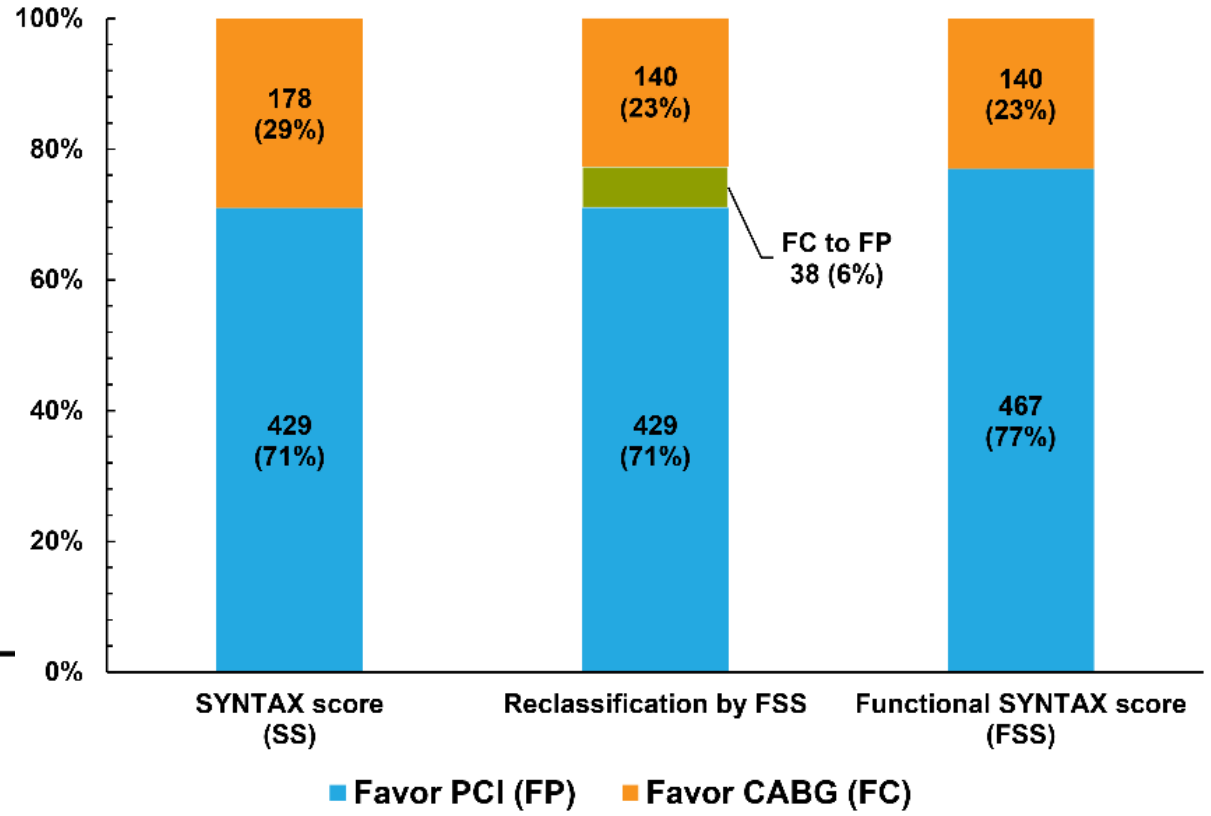




Courtesy of Bernard DeBruyne

QFR based Functional SYNTAX Score in Patients with LM or MVD

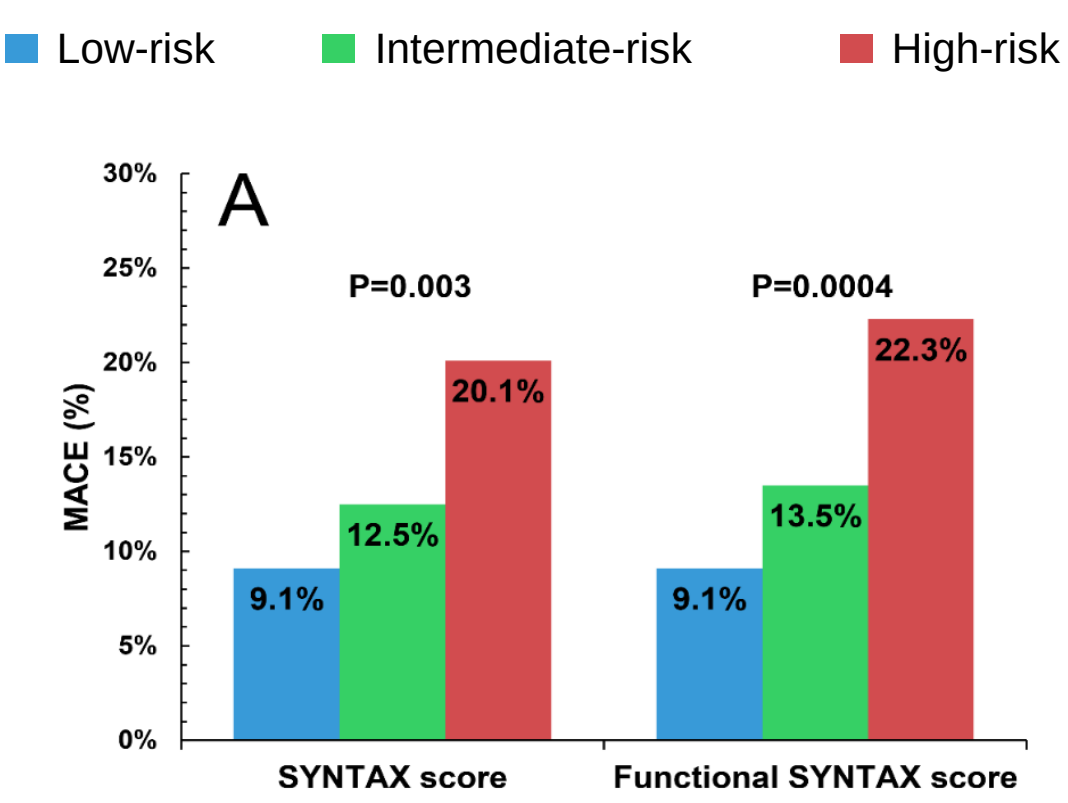


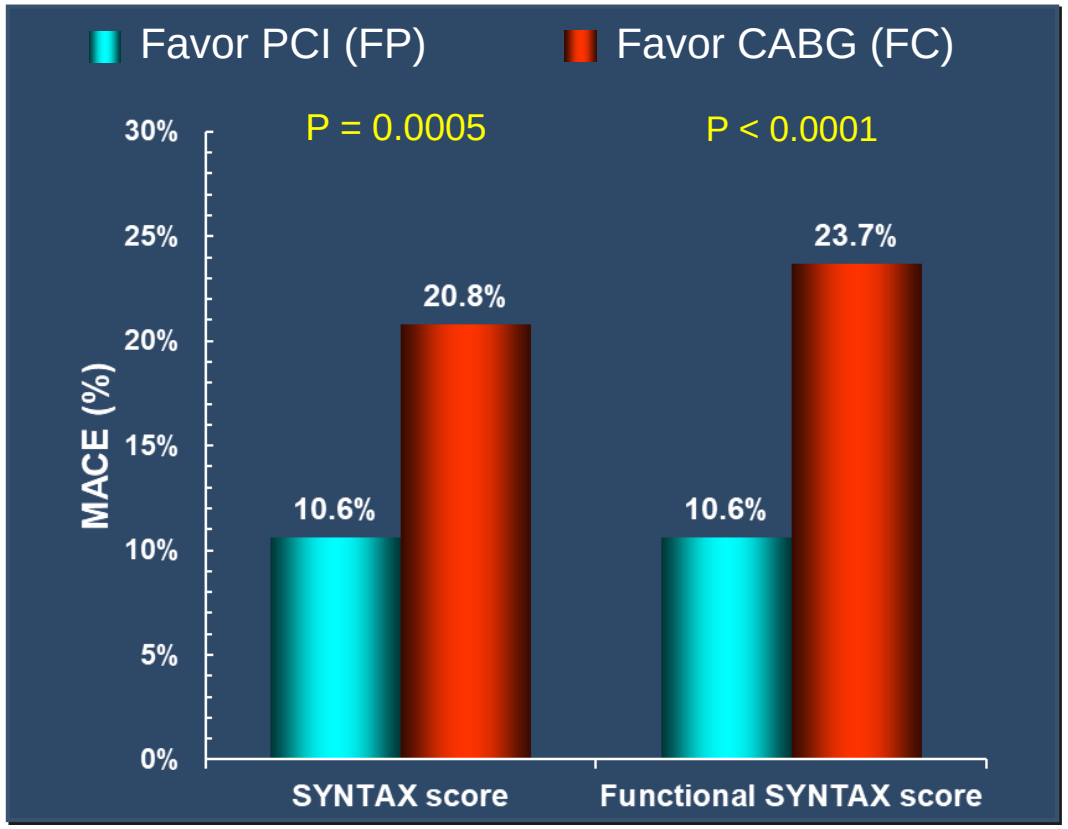


Zhang R, et al. Circ Cardiovasc Interv 2021

QFR based Functional SYNTAX Score in Patients with LM or MVD

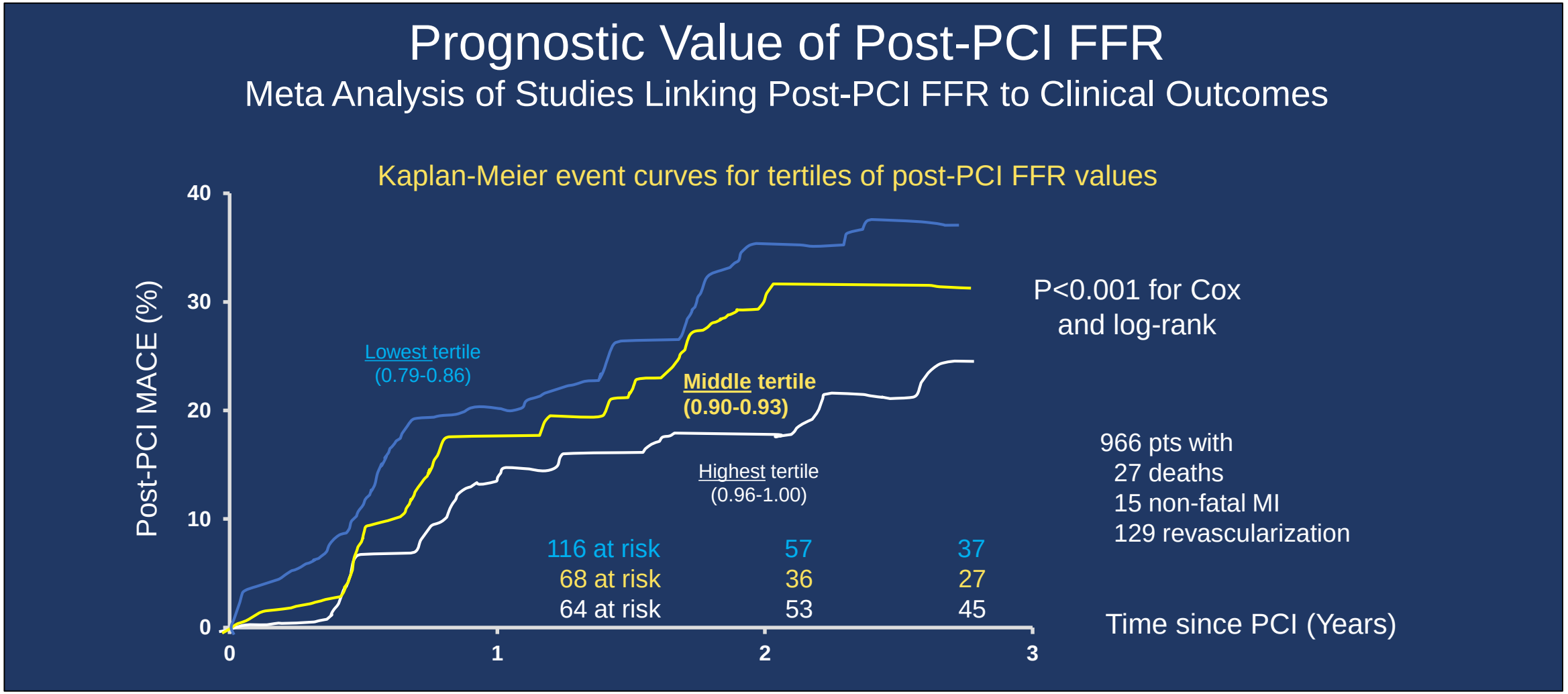
- FSS_{QFR} based revascularization strategy identify the population benefit from PCI, more effectively !
- FSS_{QFR} is independently associated with 2-year MACE





Zhang R, et al. Circ Cardiovasc Interv 2021

Post-procedure FFR with long-term outcomes



Johnson et al. J Am Coll Cardiol 2014;64:1641–54

Don’t stop until the procedure has been optimized,

Your patients will have a better long-term result.

Viewpoint 2

CHIP with unstable hemodynamic status,

no time to perform the physiology assessment !

Not waste time, instead, save time and resource !

Viewpoint 3

CHIP patients with heart / renal failure,

Physiology assessments increase the risk !

WRONG !

Viewpoint 3

CHIP patients with heart / renal failure,

Physiology assessments increase the risk !

Physiology guidance could

Minimize the contrast using !

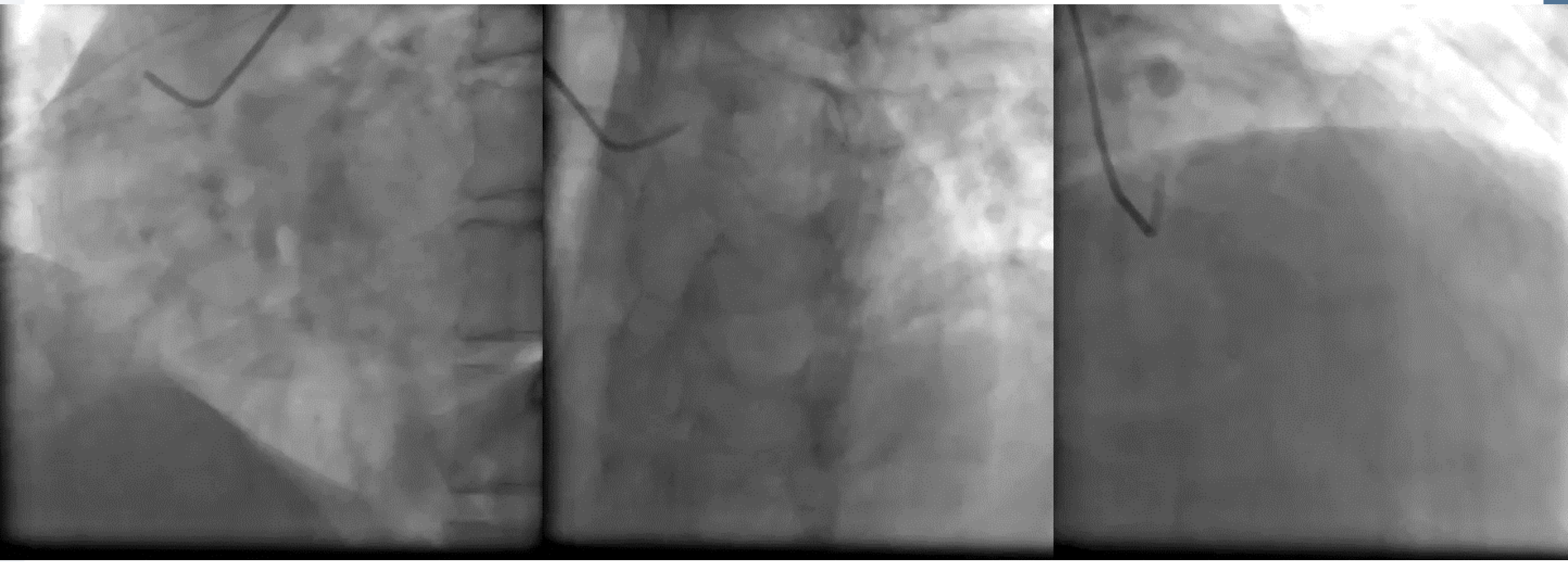
CHIP with heart / renal failure,

Physiology guidance could

Minimize the contrast using

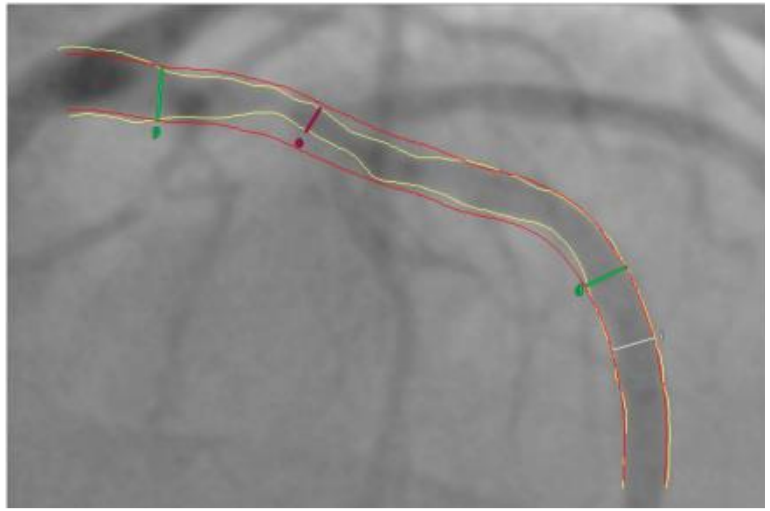
We can even perform a PCI with Zero contrast !

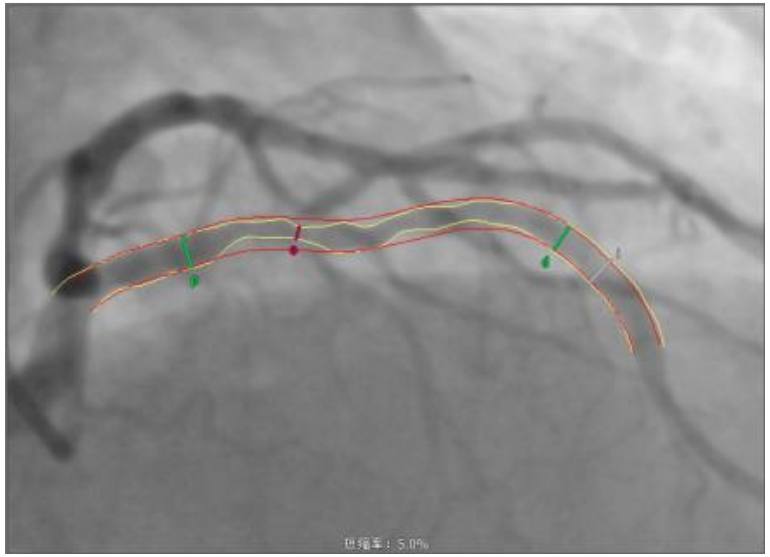
A Case of Zero Contrast PCI

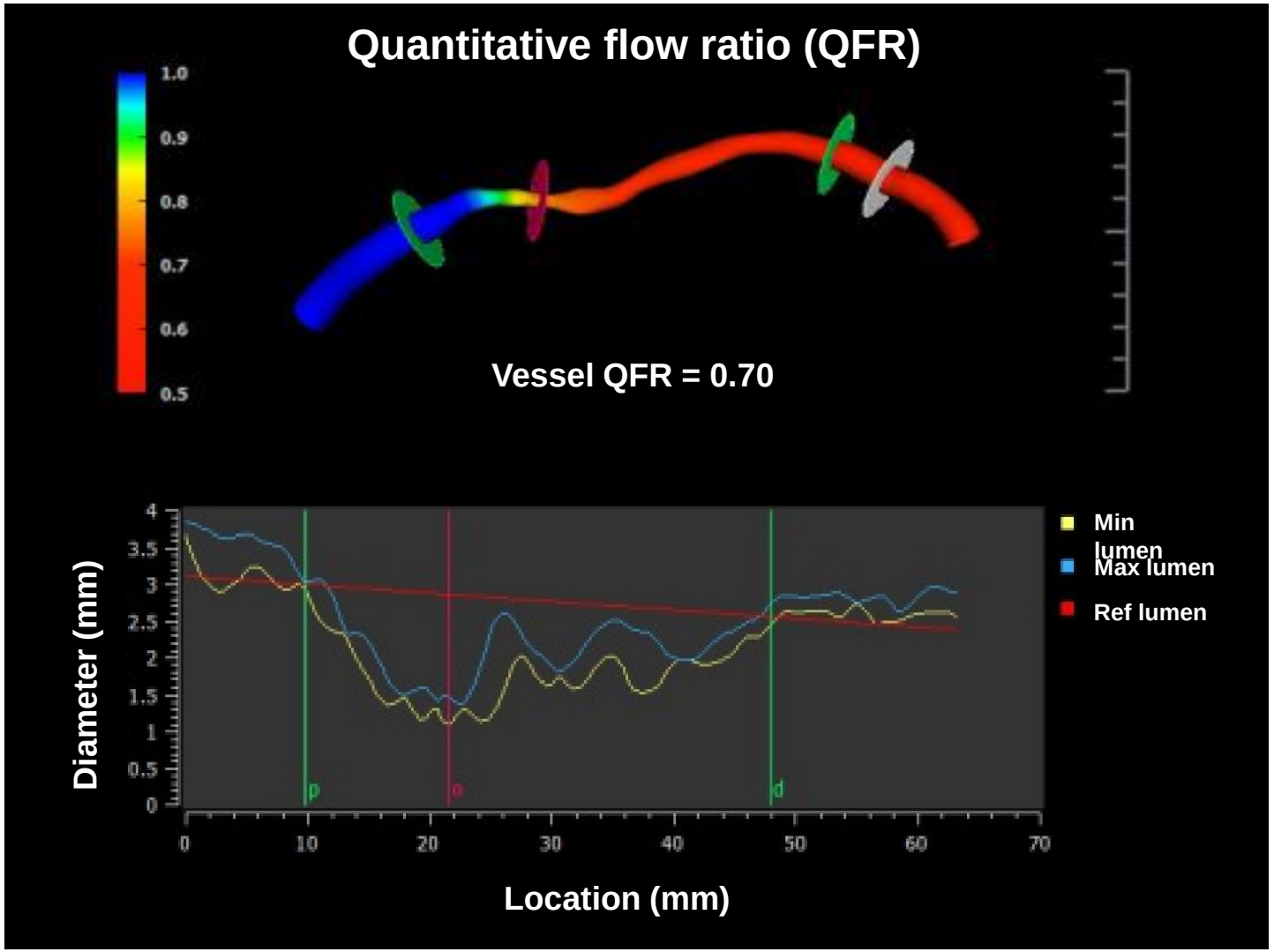


Male 69, contrast induced anaphylactic shock during previous CAG 5 years ago

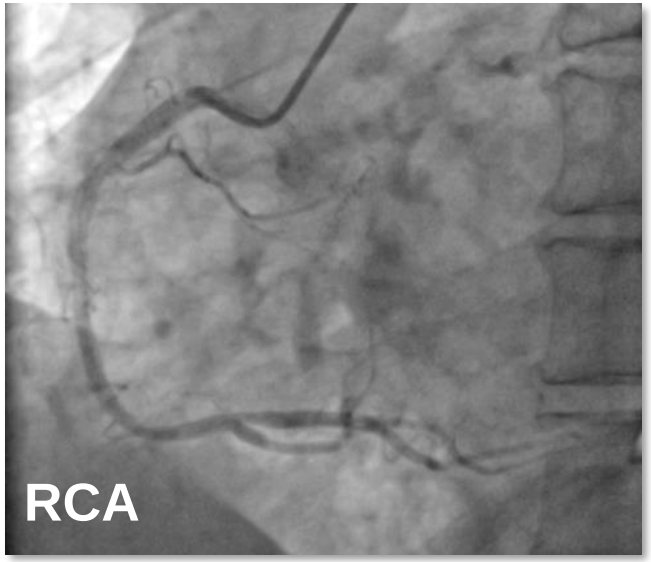
QFR derived from angiography 5 years ago

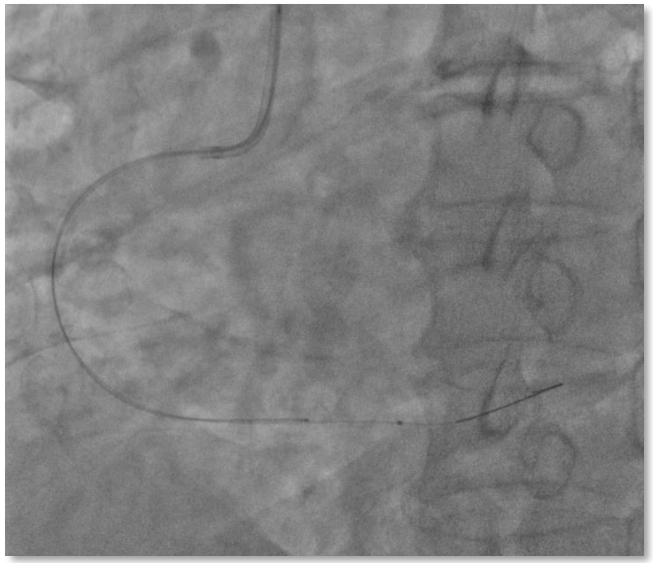


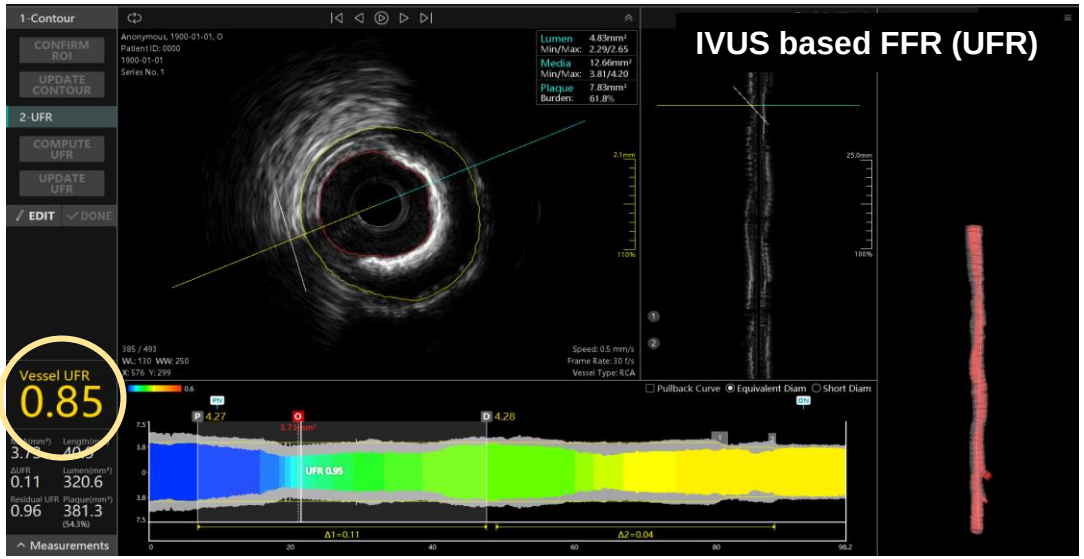




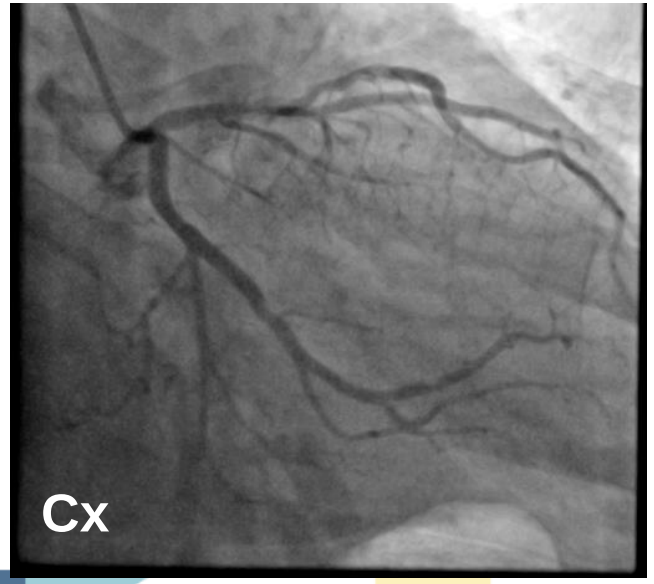
This time, we perform IVUS/UFR assessments in all three vessels





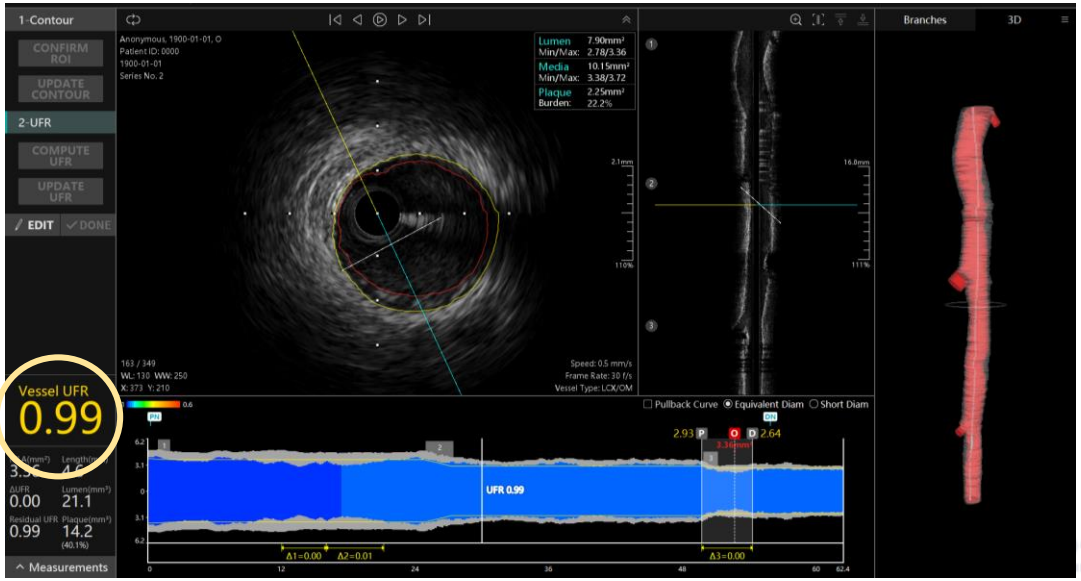


Angio 5-Year before

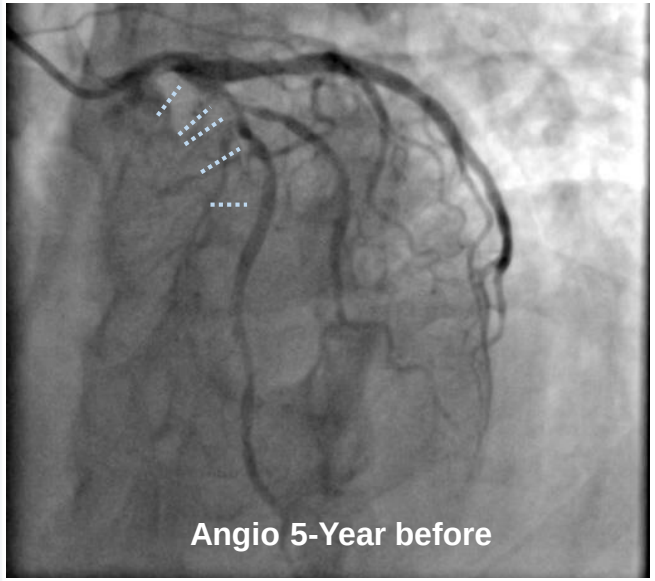


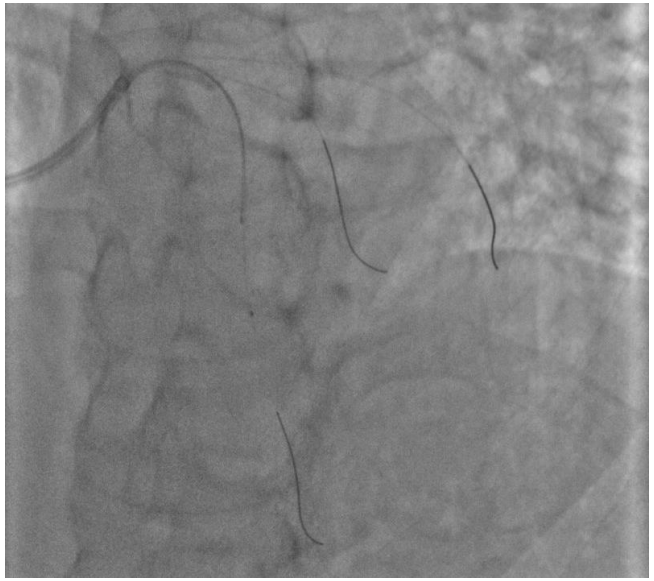
IVUS

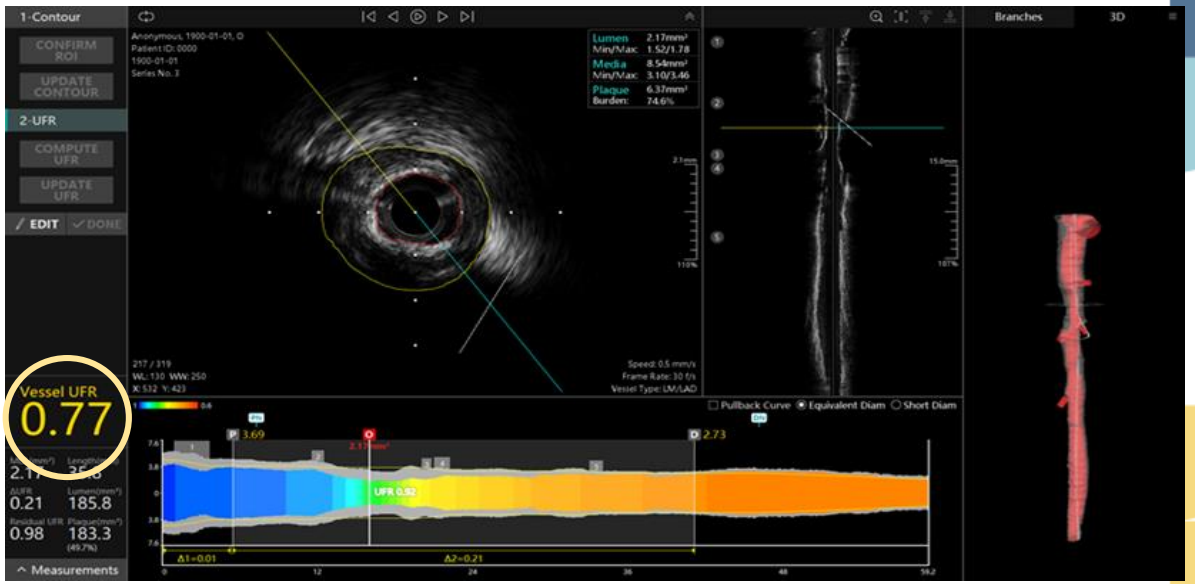
IVUS / UFR

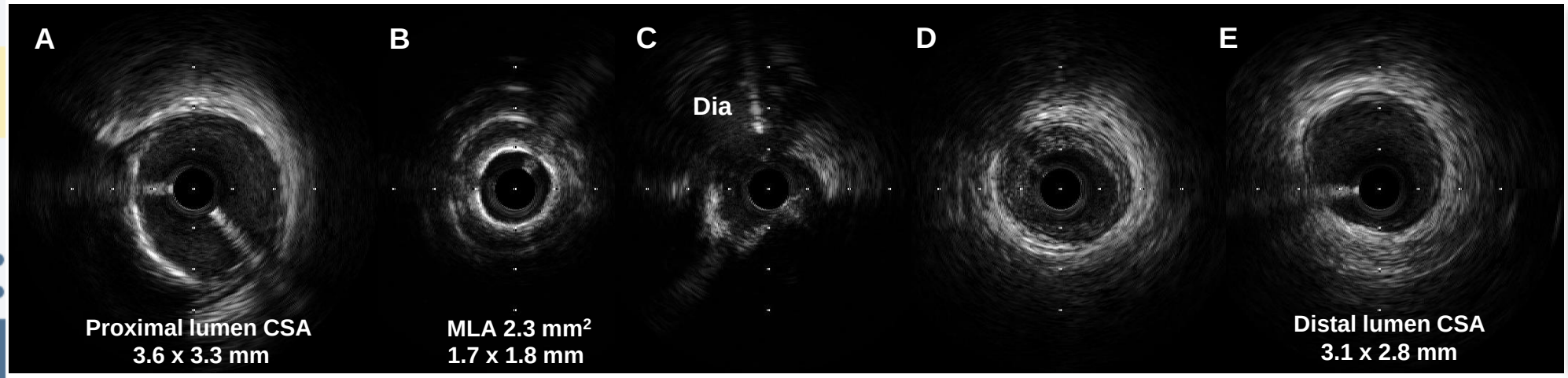


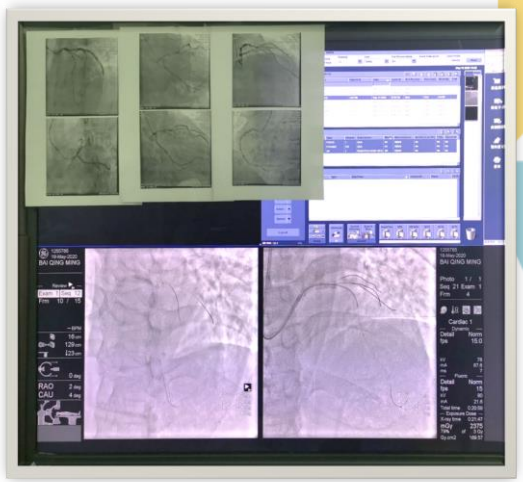
LAD


Angio 5-Year before



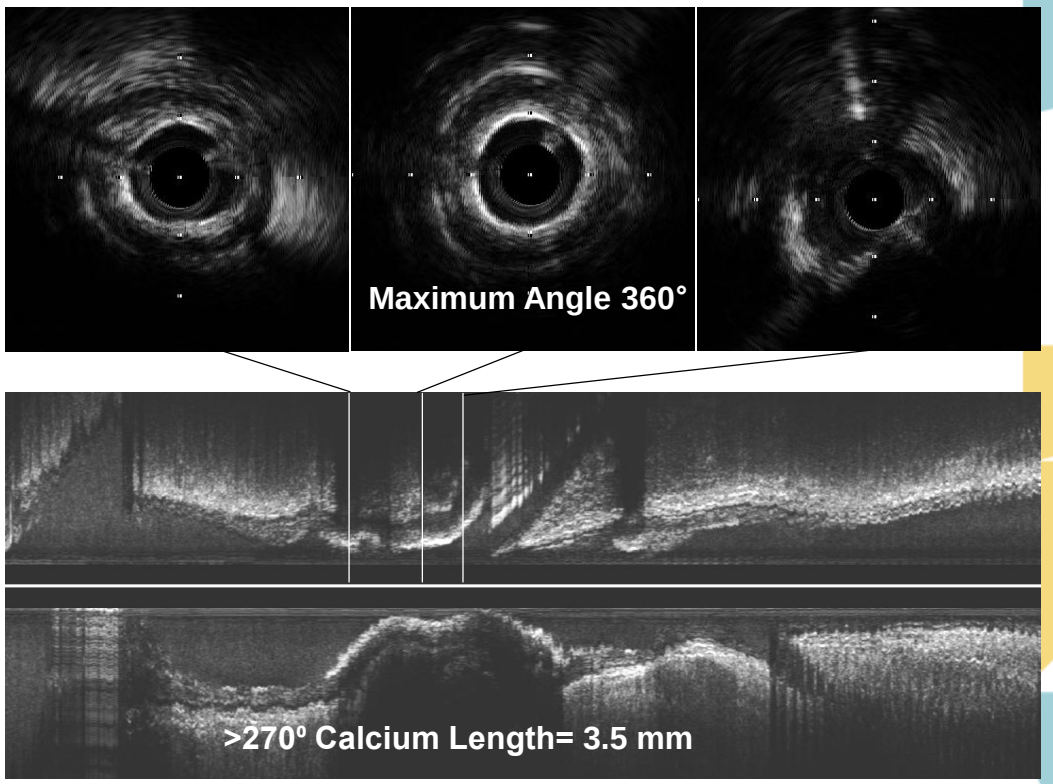

1-Contour
CONFIRM ROI
UPDATE CONTOUR
2-UFR
COMPUTE UFR
UPDATE UFR
EDIT
DONE
Lumen 2.17mm²
Min/Max 1.52/1.78
Media 8.54mm²
Min/Max 3.10/3.46
Plaque 6.37mm²
Burden: 74.6%
Branches
3D
Vessel UFR
0.77
0.21
185.8
0.98
183.3
Measurements
Pullback Curve
Equivalent Diam
Short Diam


A
B
C
Dia
D
E
Proximal lumen CSA
3.6 x 3.3 mm
MLA 2.3 mm²
1.7 x 1.8 mm
Distal lumen CSA
3.1 x 2.8 mm



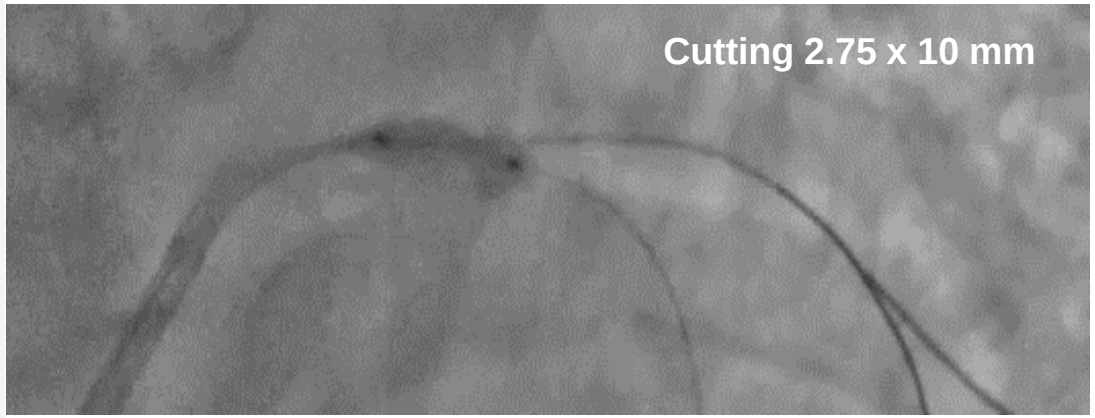
Calcification assessment in IVUS

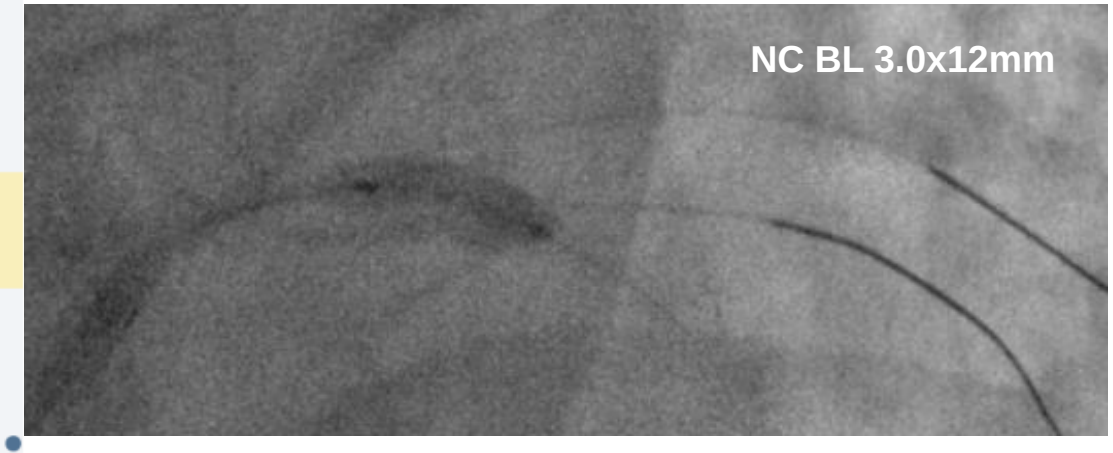
1. Maximum Angle
   - 360°
2. >270⁰ Calcium Length
   - 3.5 mm
3. Not thick
   - Reverberations
   - No calcific nodule

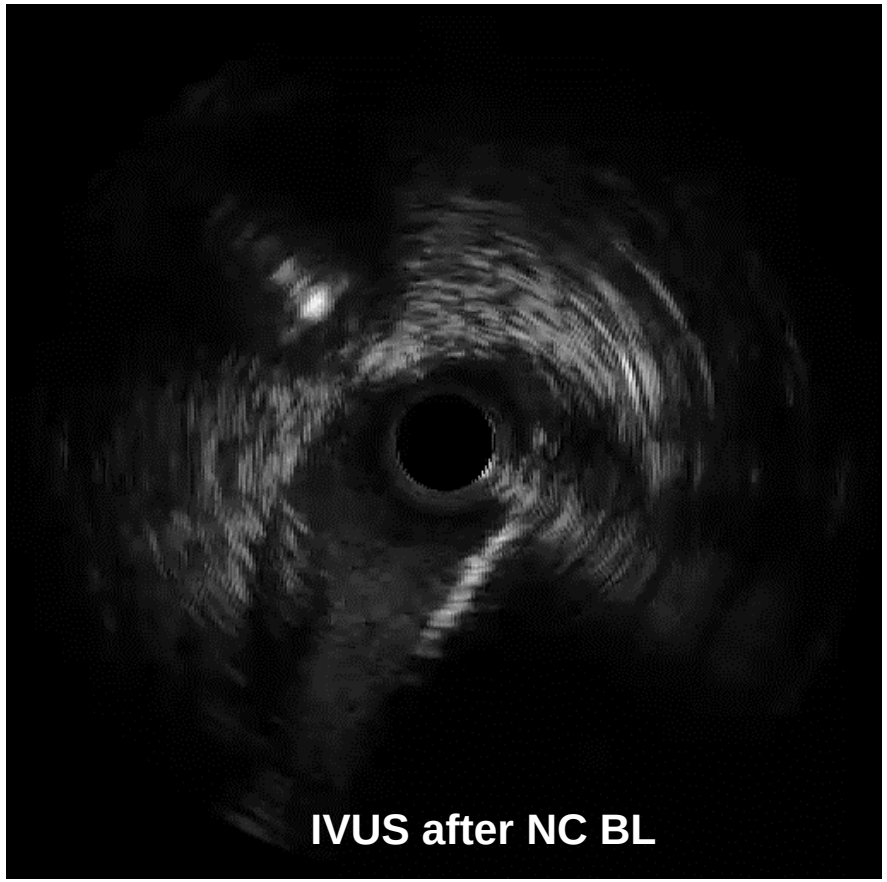


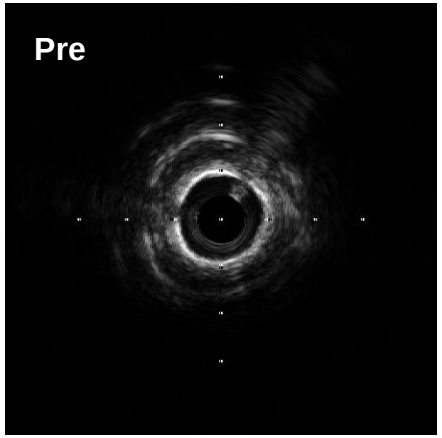
A good stent expansion could be achieved without ROTA

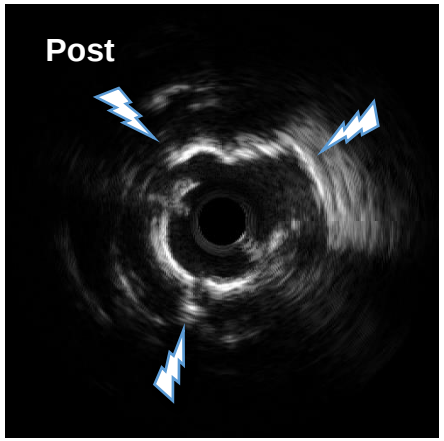
Cutting and NC Ballooning



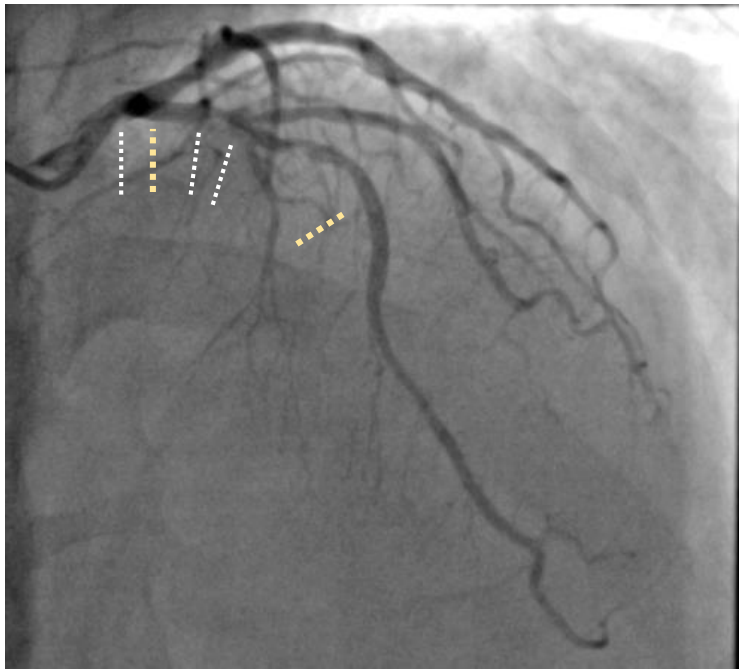


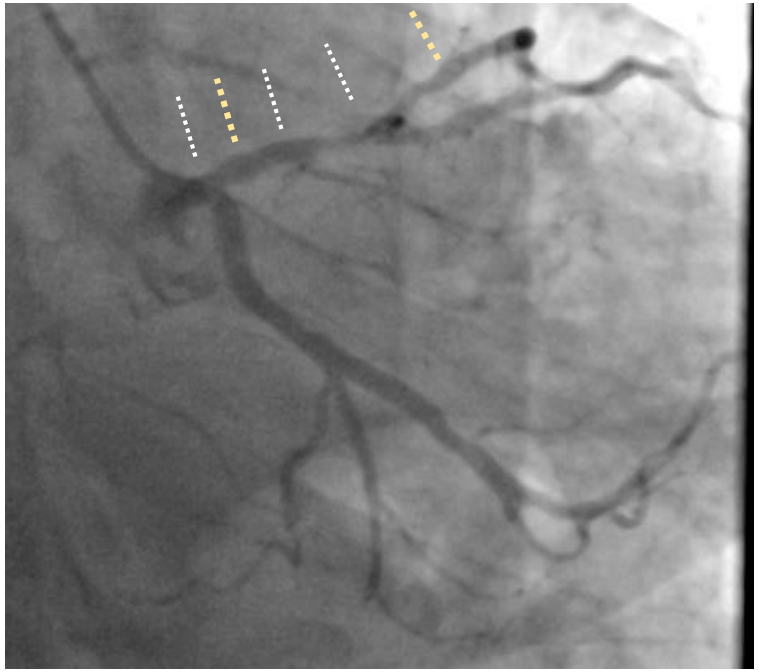


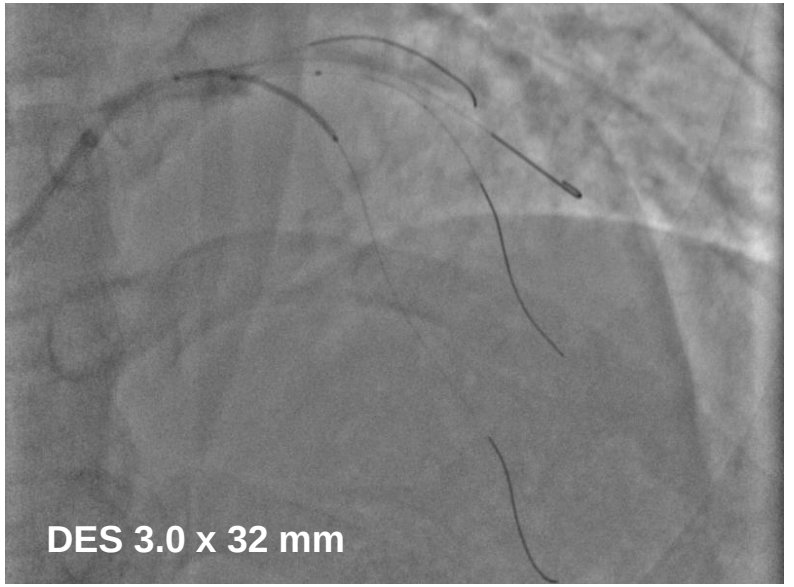


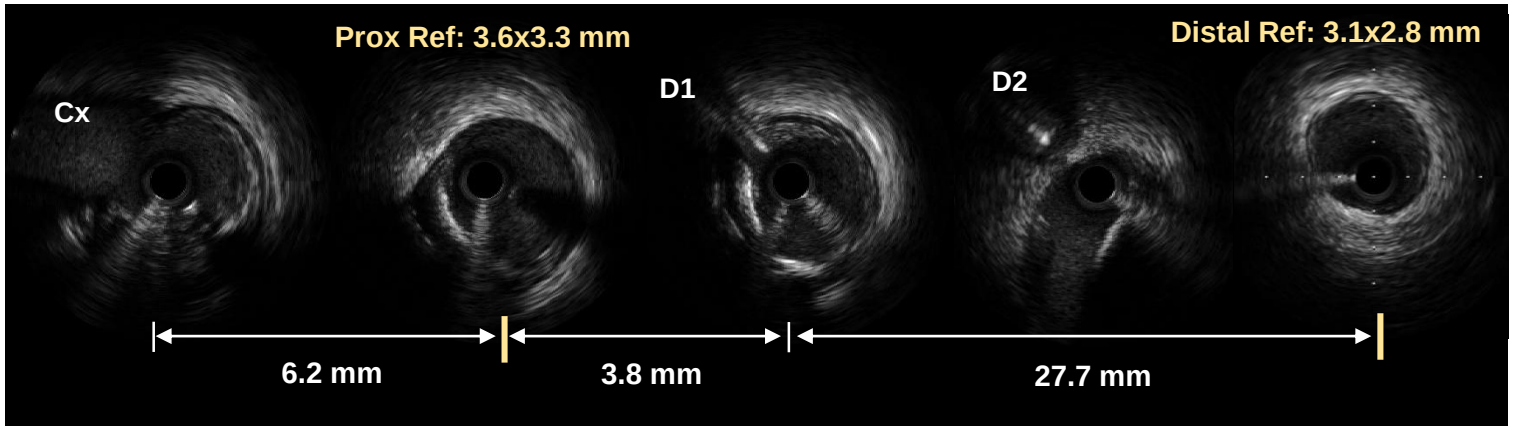


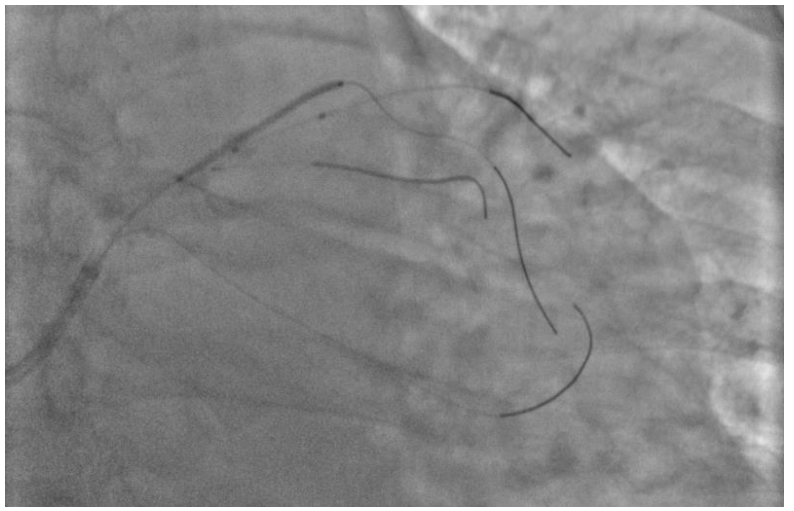
Stenting



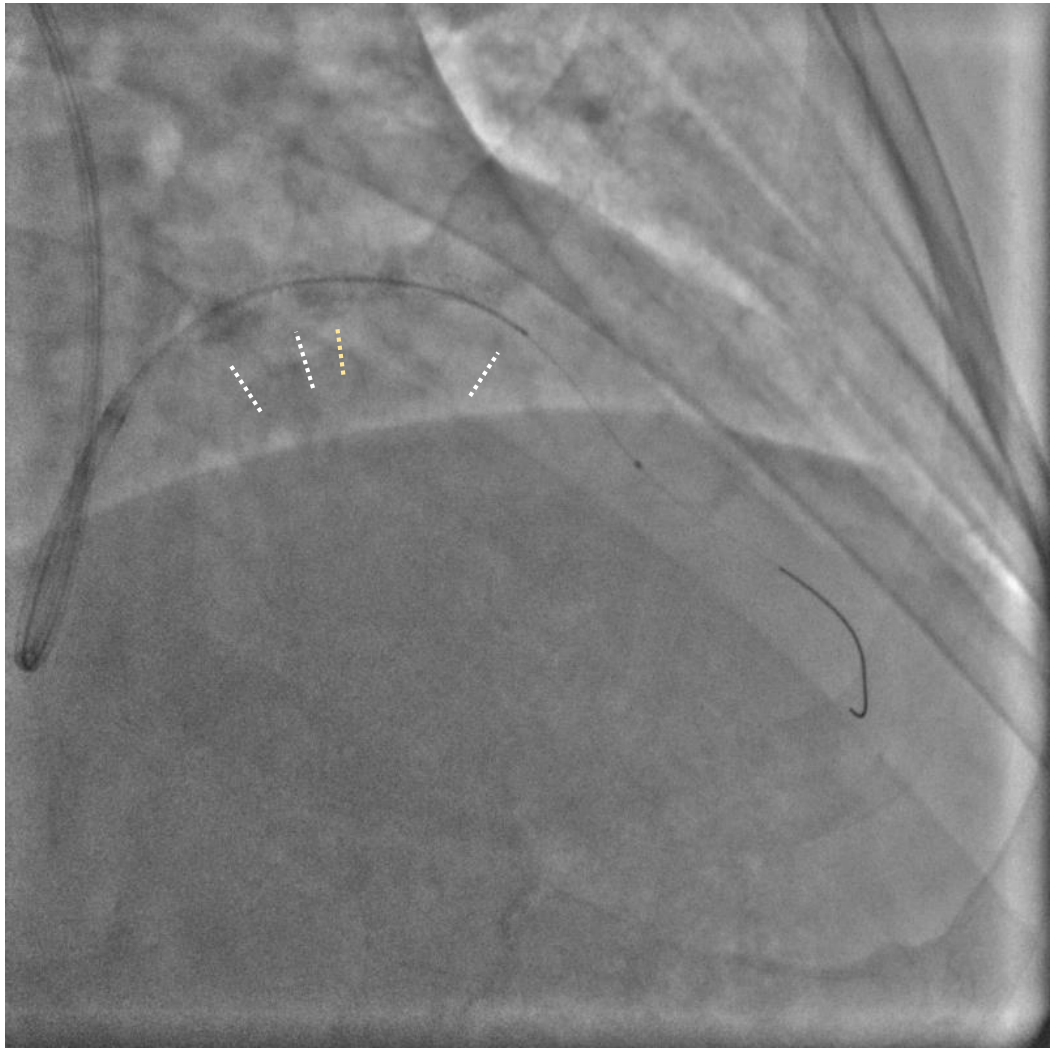


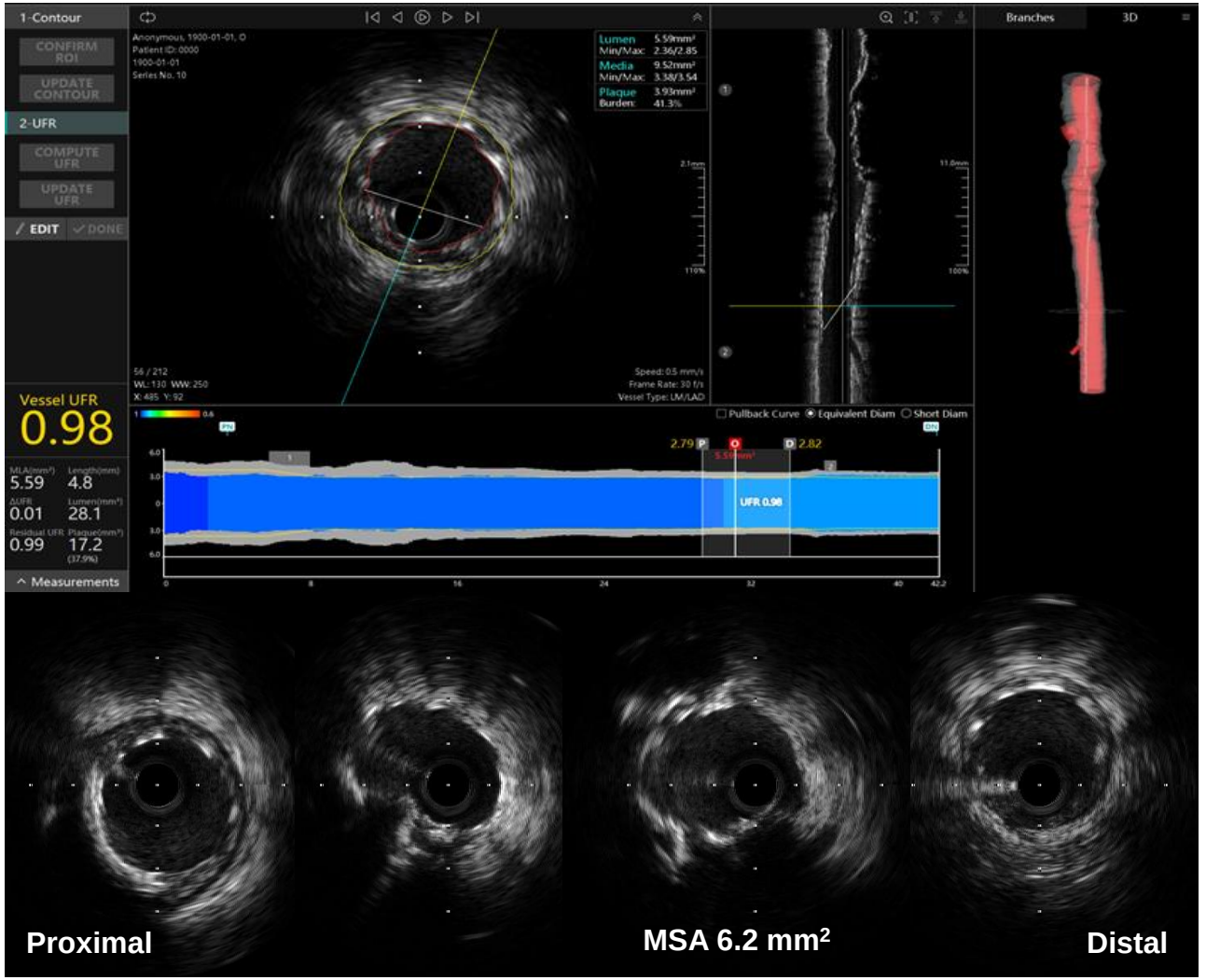

DES 3.0 x 32 mm


Prox Ref: 3.6x3.3 mm
Distal Ref: 3.1x2.8 mm
Cx
D1
D2
6.2 mm
3.8 mm
27.7 mm



Final IVUS and UFR





Summary

- Physiology is key to decide appropriate PCI strategy
- Physiology can be used to plan PCI approach, particularly for LM/bifurcation, diffuse/tandem lesions, or in MVD cases
- Use physiology for stent optimization in CHIP pts
- Use physiology to save contrast is a real concern
- Don’t stop until the procedure has been optimized, including both imaging and physiological optimization