Valoración functional coronaria con angio TAC (Heart Flow)

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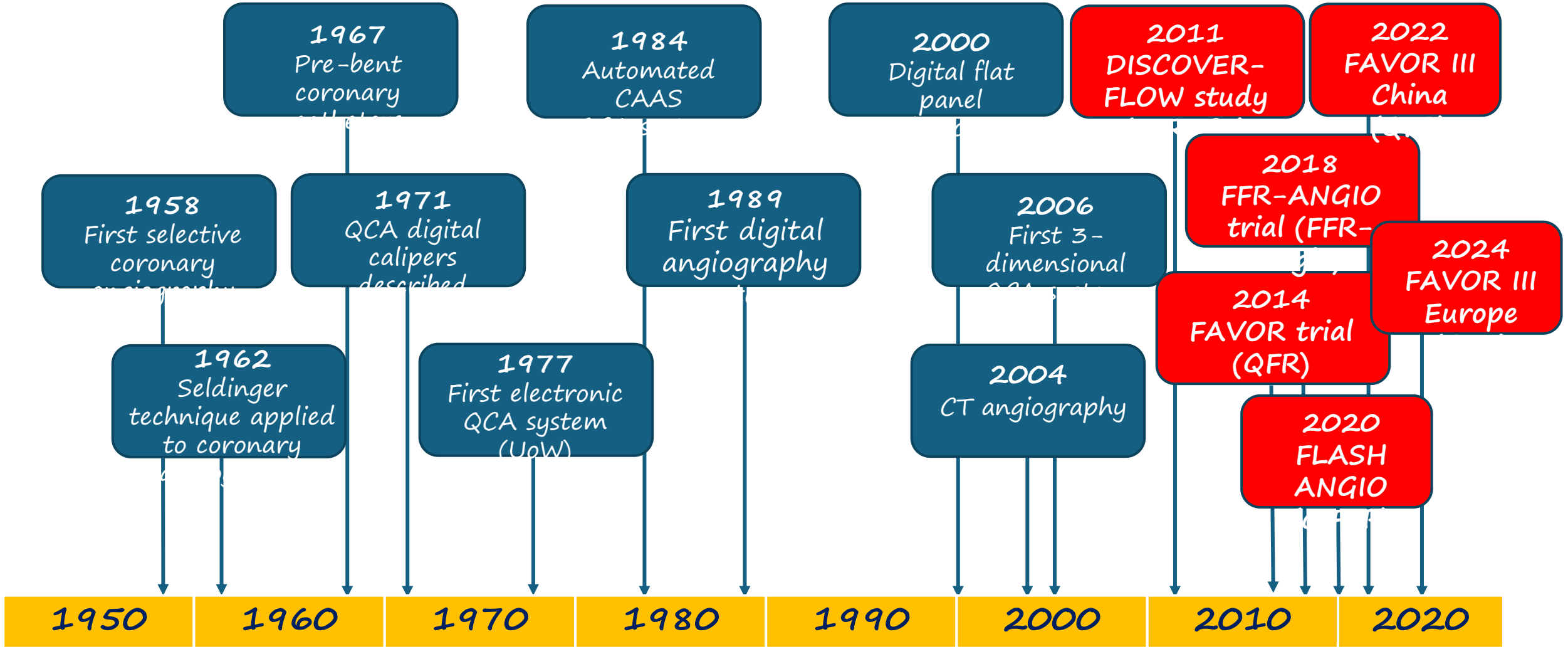
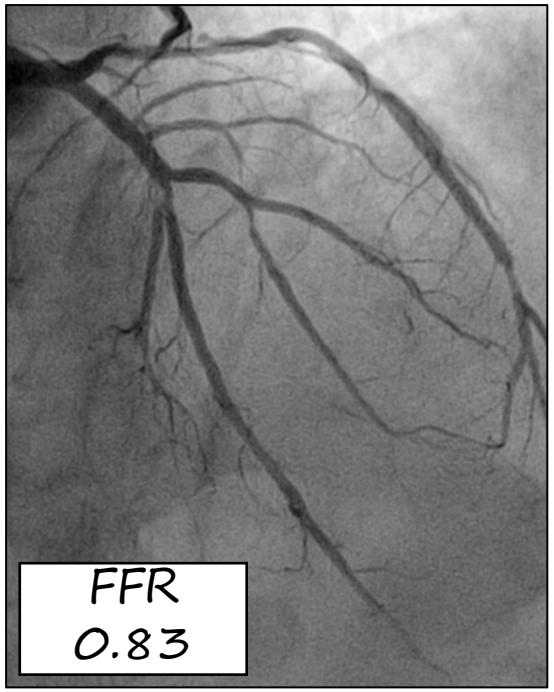
Hospital Clínico San Carlos
Madrid

Coronary angiography: relevant landmarks



CT-based functional coronary angiography: the quest for a simpler approach to functional assessment

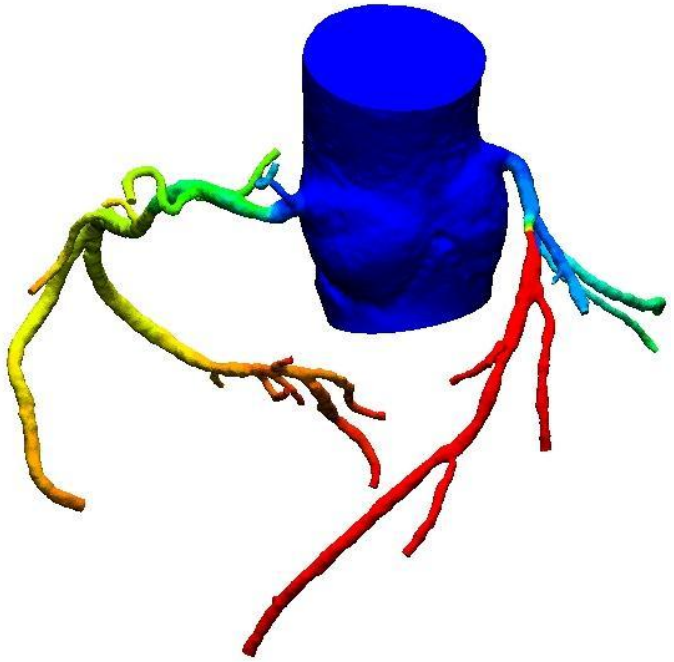


No wires

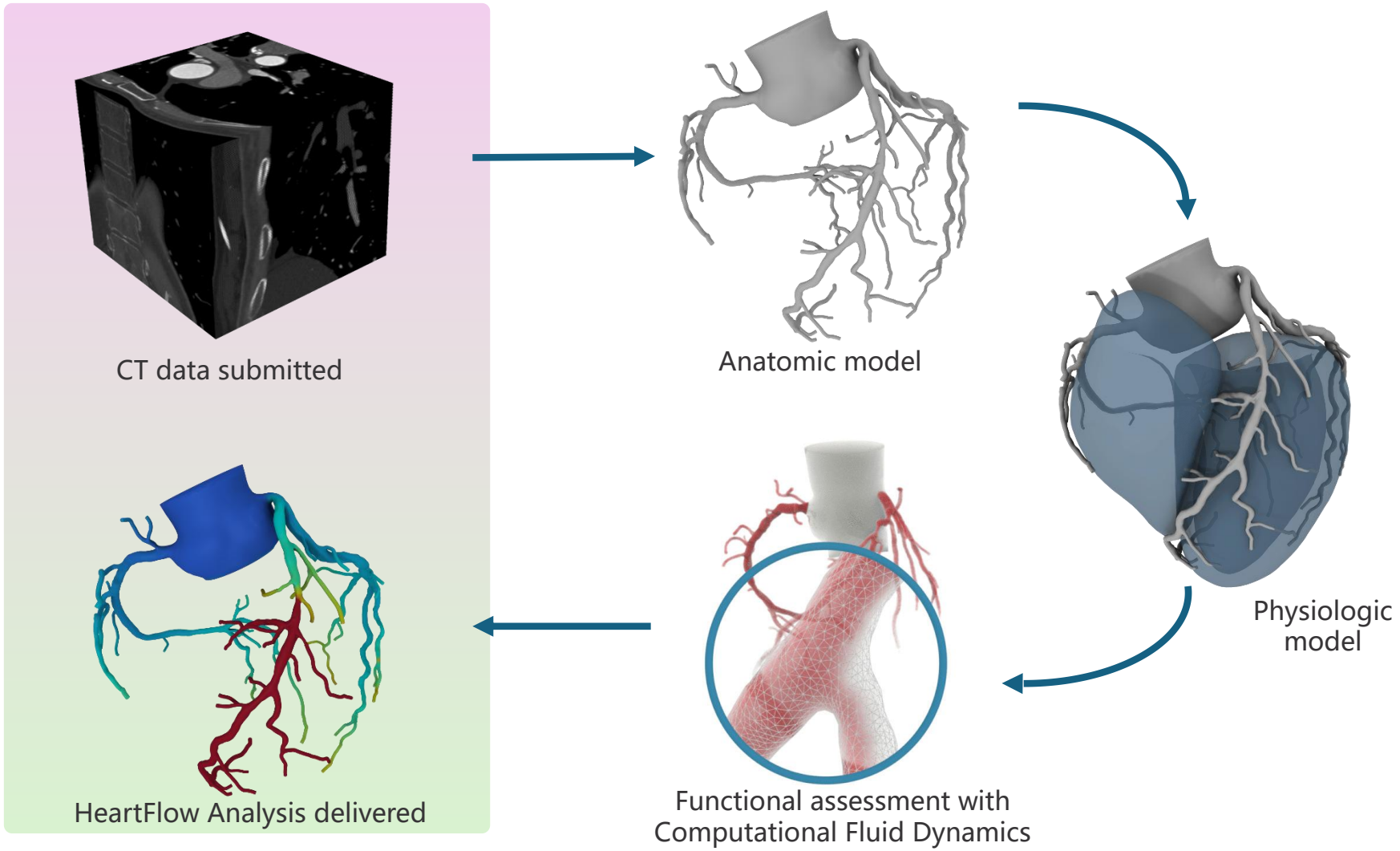
No adenosine

No additional procedures

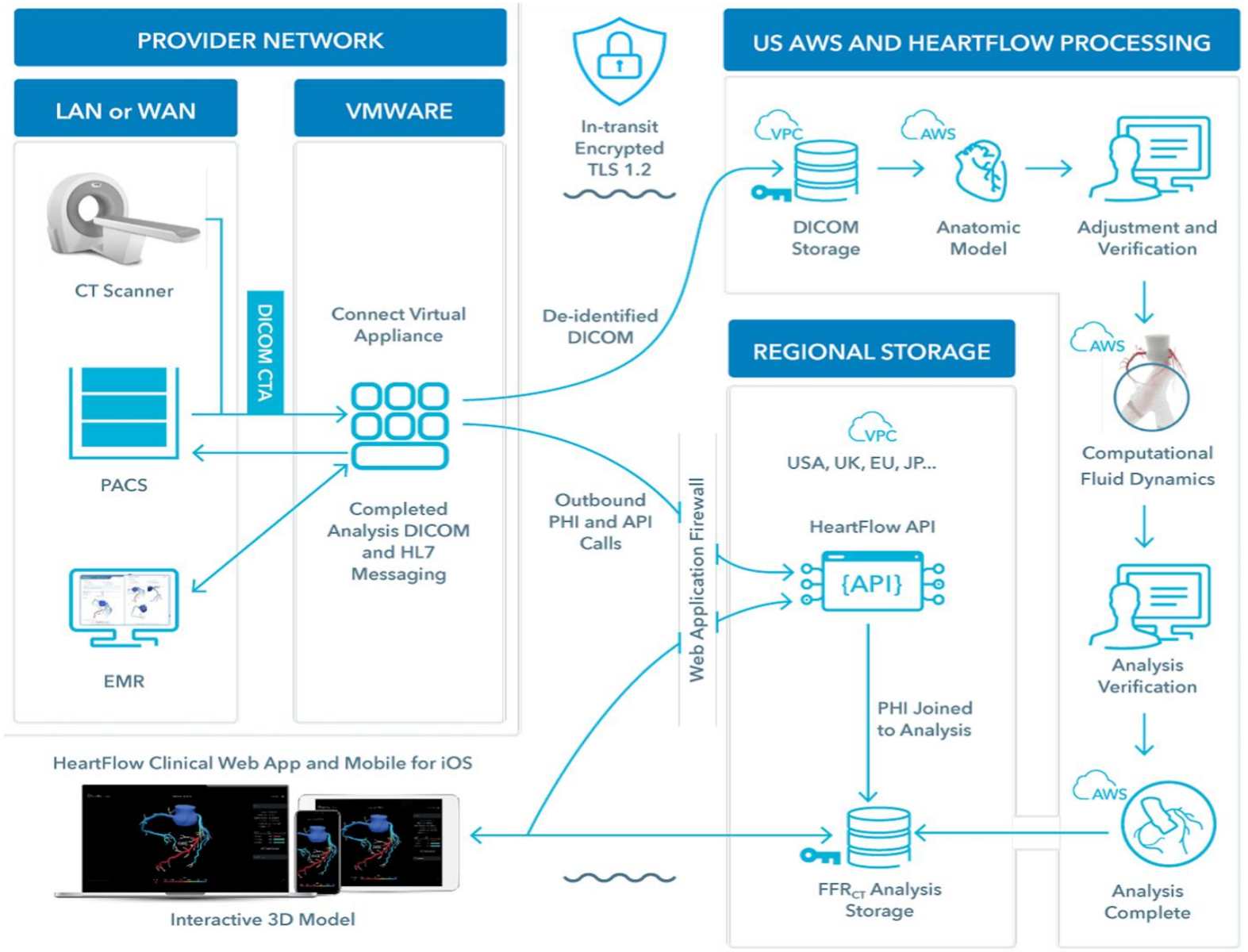
Just CT angiography



FFR_{CT} Analysis: combining anatomy and physiology



FFR_{CT} analysis workflow



HeartFlow
Cases
Lingens, Rudolf 05/12/1954
Dr. John Smith
Info
Patient ID PAT-012345
CT Study Date 08/30/16
Referring Physician Dr. John Smith
Institution HeartFlow Demo
HeartFlow ID ABC-1234-56789
CT Series 3
CORONARY SYSTEMS
LOWEST FFRCT
0.0 0.2 0.4 0.6 0.8 1.0
LAD System 0.58
LCX System 0.87
RCA System 0.89
Download Summary
Warnings
occlusion
FFRCT
0.00 0.60 0.70 0.80 0.90 1.00
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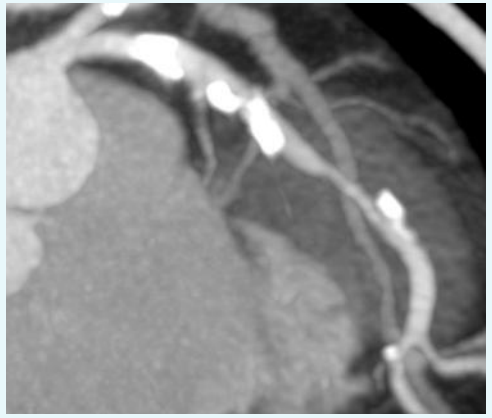
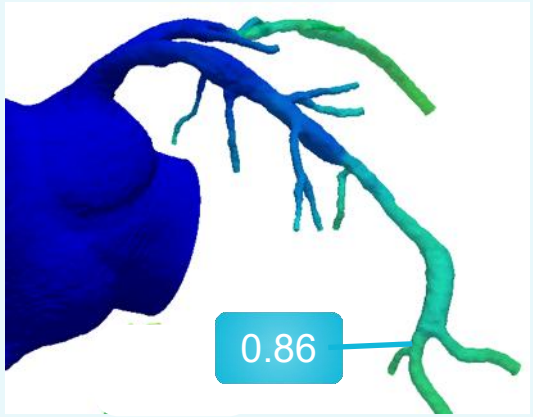
Anatomy + physiology in clinical decision making

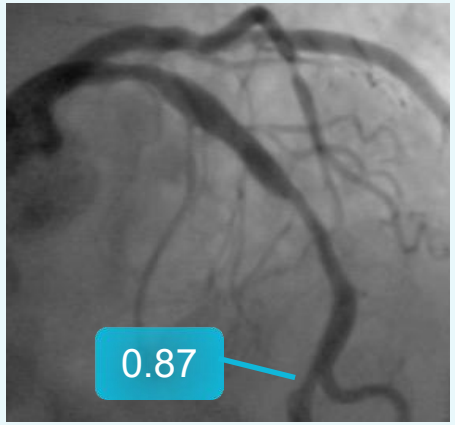
Patient A

CTA 70% LAD Stenosis



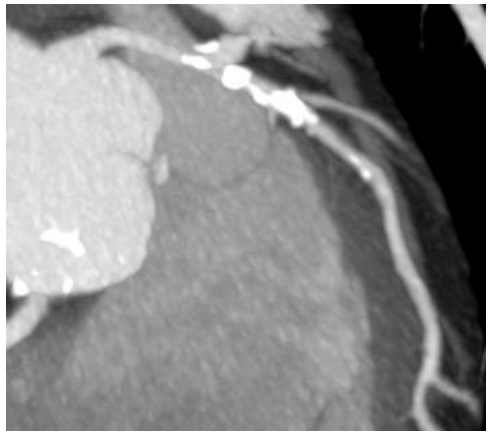


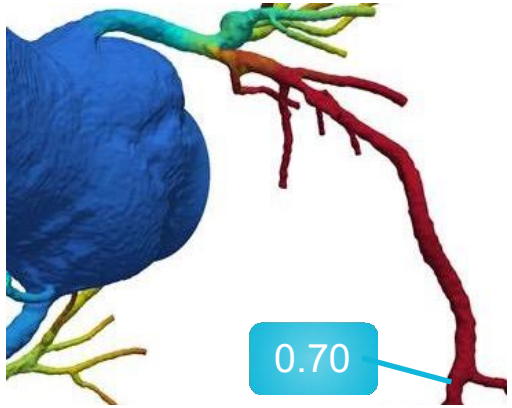
Angio 70% LAD Stenosis



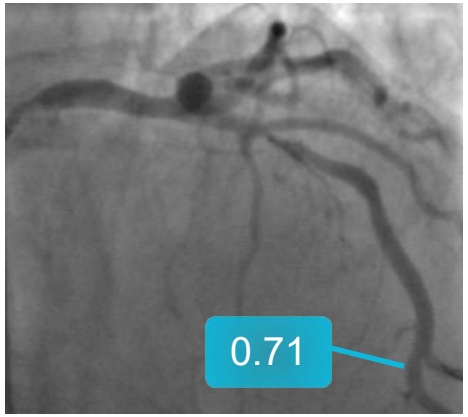
Patient B

CTA 70% LAD Stenosis

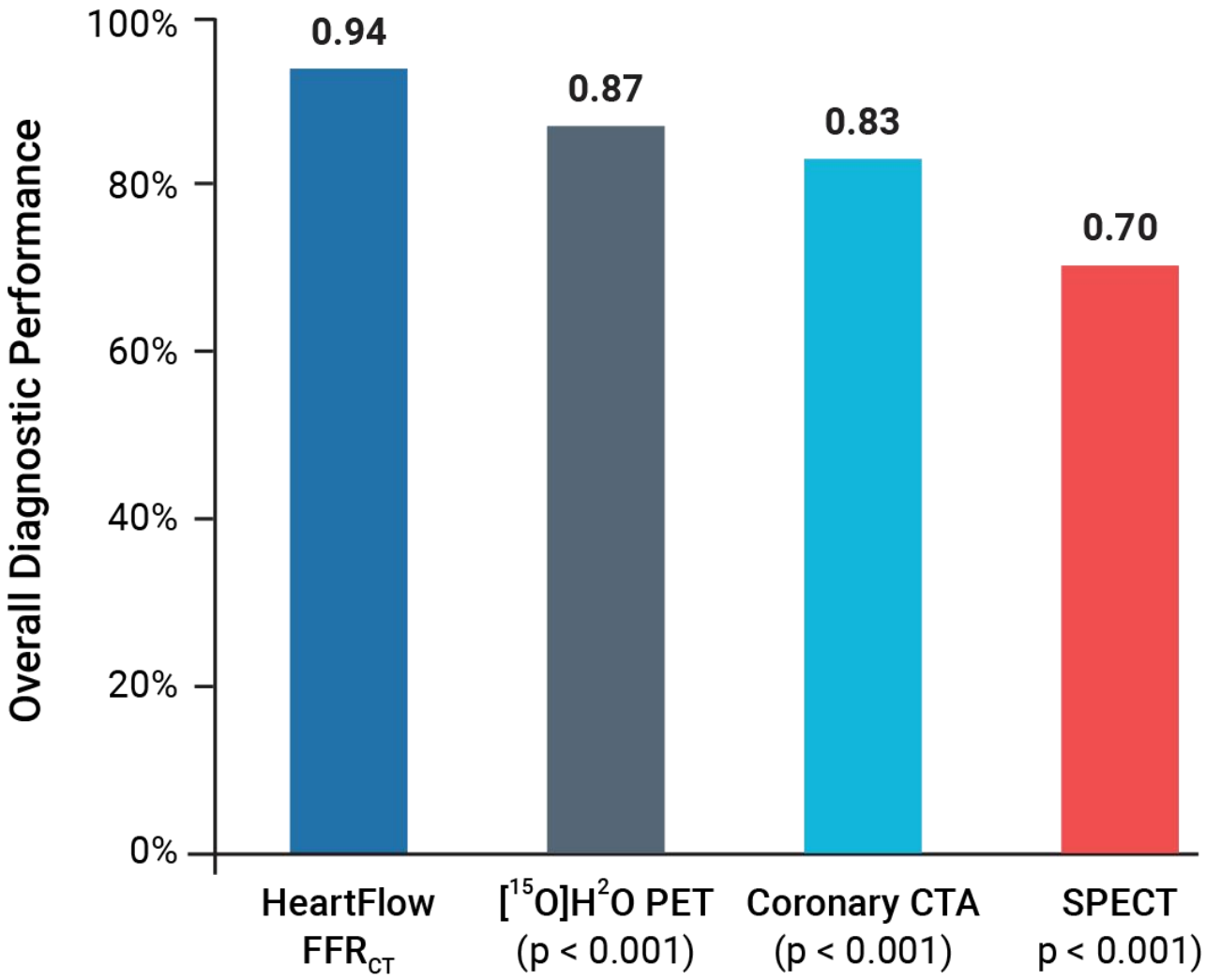




Angio 70% LAD Stenosis



Diagnostic accuracy of FFR-CT



Diagnostic accuracy:

- **87%** (PACIFIC, JACC 2019)
- **86%** (NXT, JACC 2014)

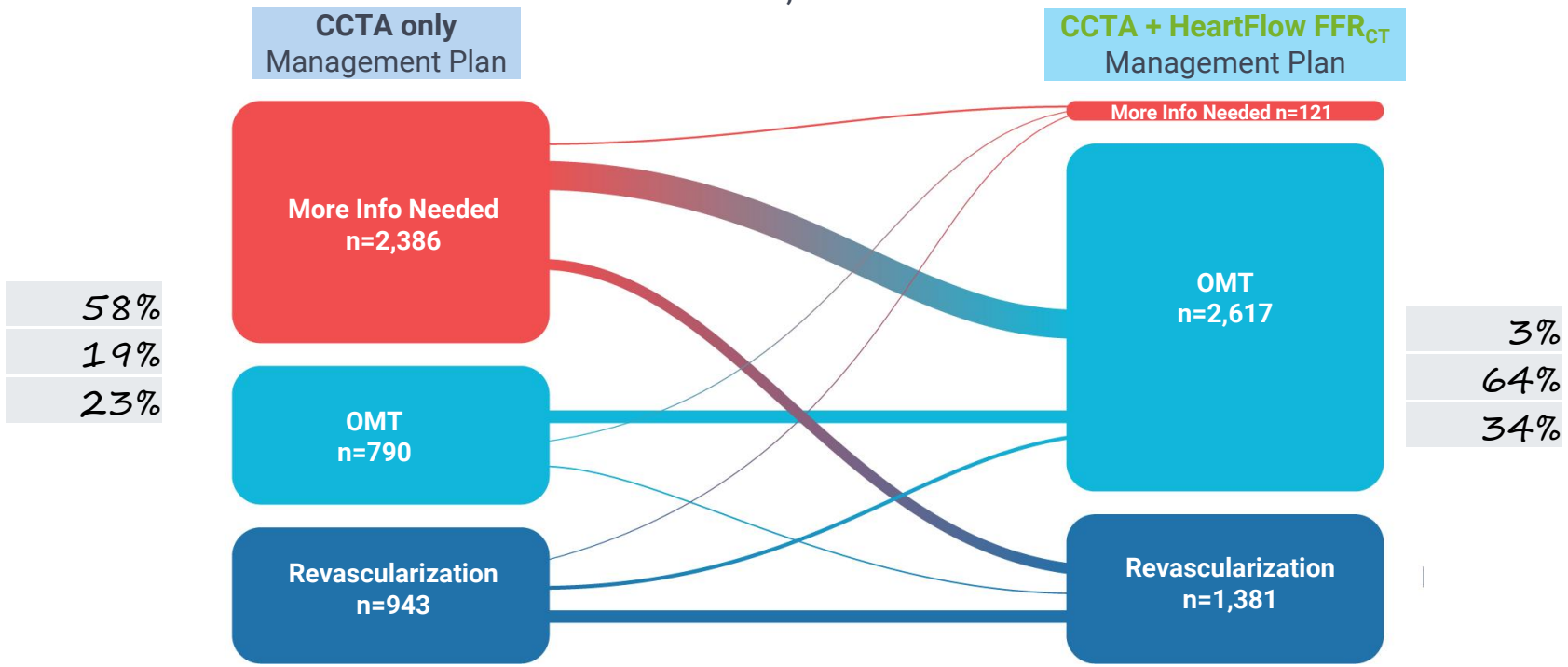
P-values reflect comparison to the FFR$_{CT}$ Analysis.

Driessen, et al. J Am Coll Cardiol 2019. | Nørgaard, et al. J Am Coll Cardiol 2014.

FFR_{CT} : Impact on treatment plan

ADVANCE Registry

N =4,119

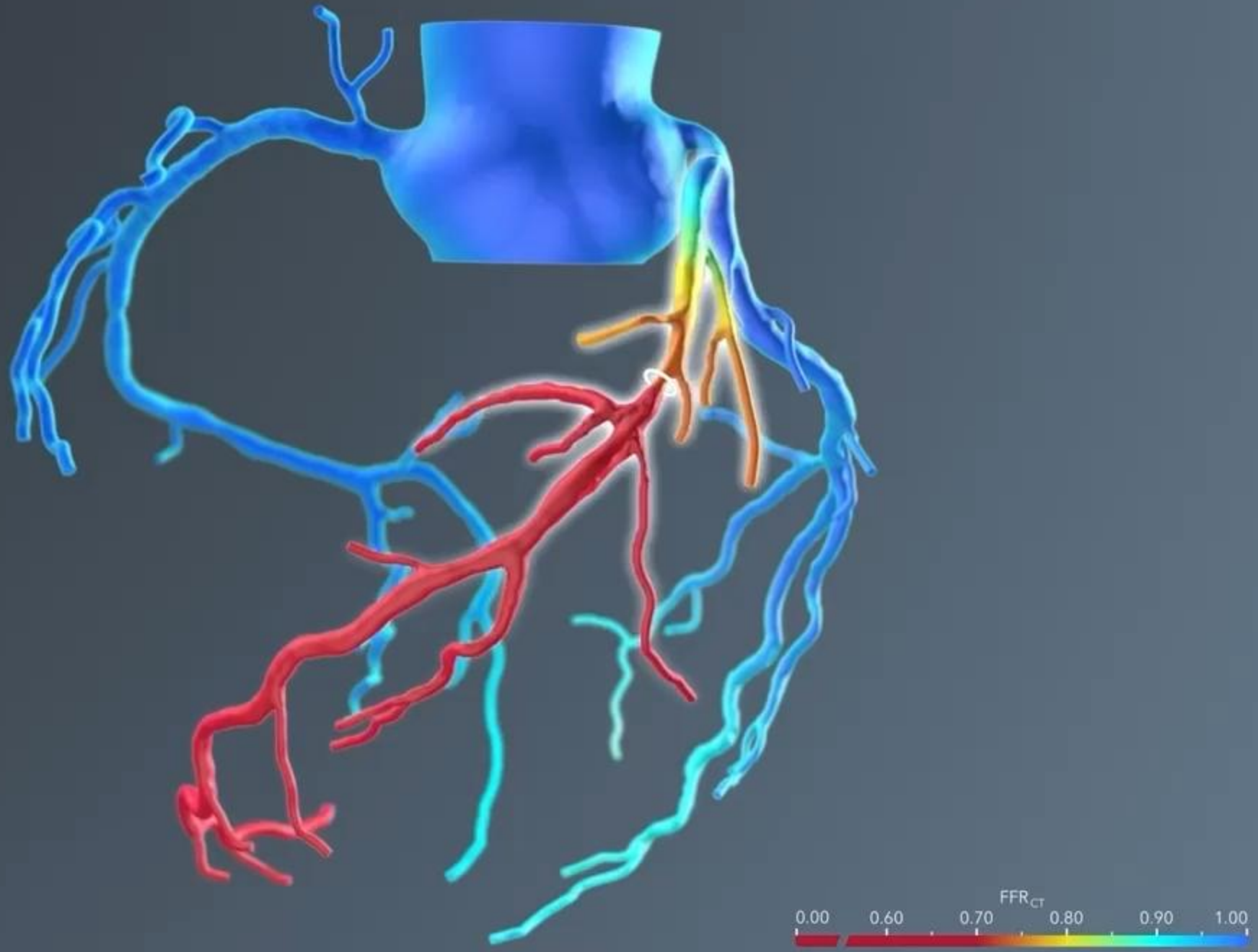


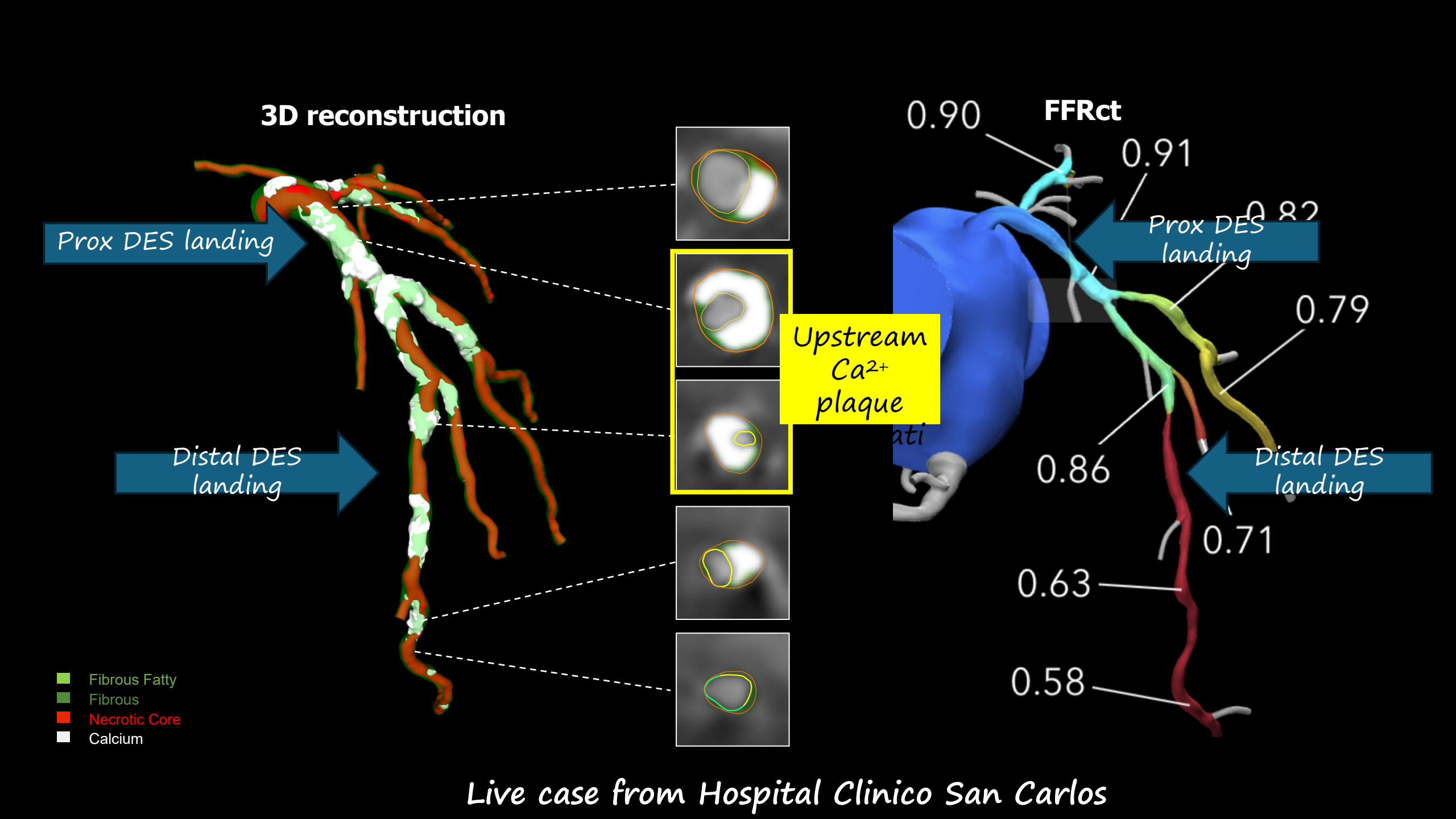
Patients with clear treatment plan

CCTA only	42%
CCTA + FFR_{CT}	97%

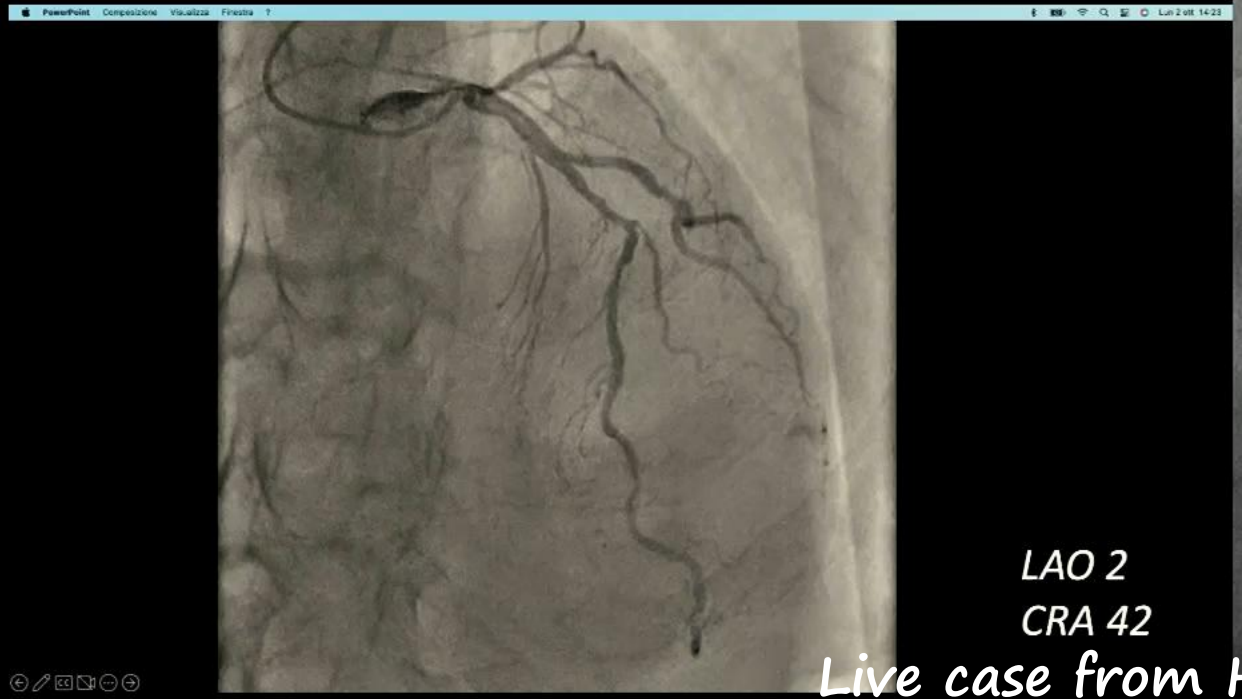
Patel M et al. JACC Cardiovasc Imaging. 2020 Jan;13(1 Pt 1):97-105.

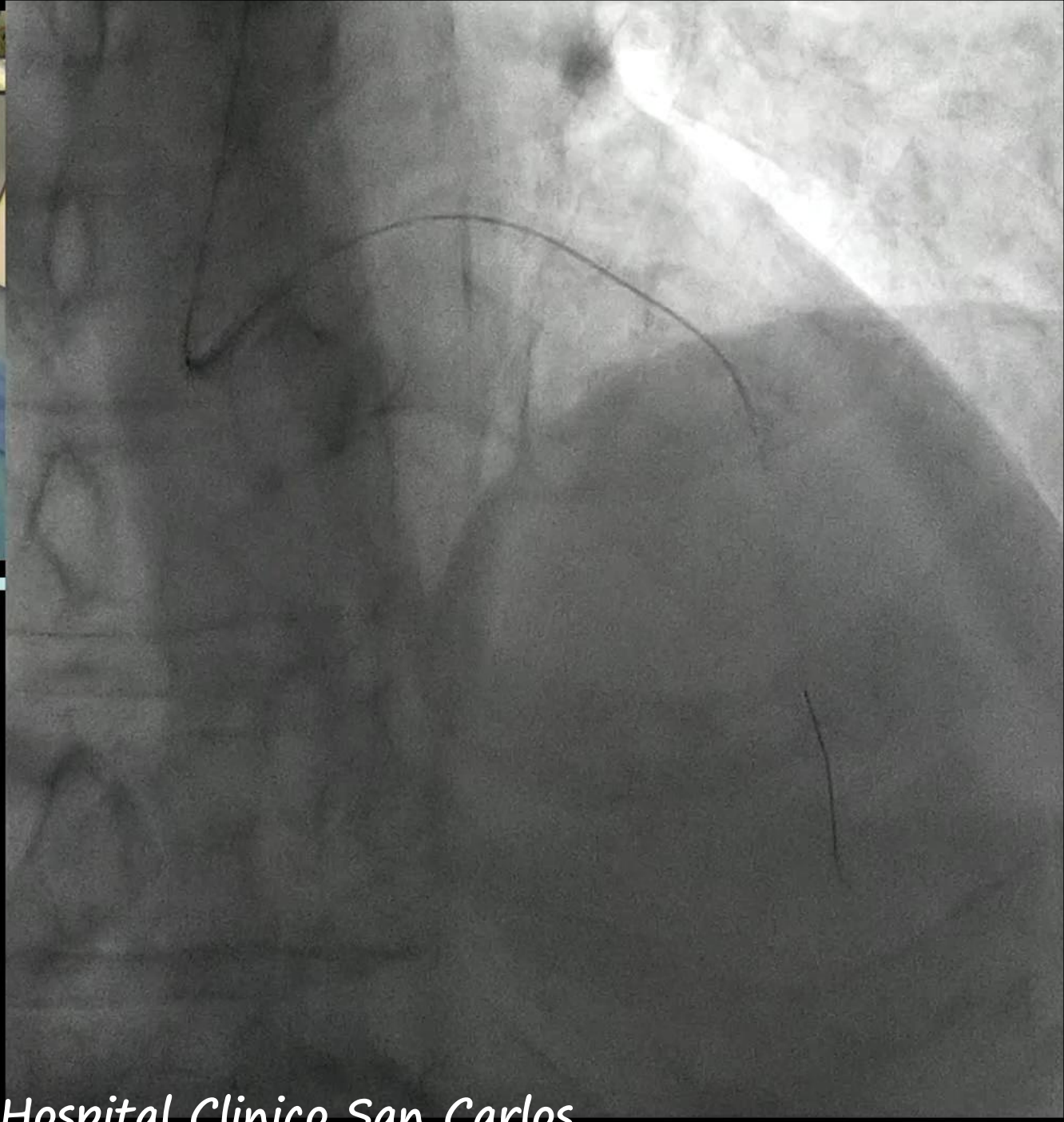
HeartFlow®


FFR$_{CT}$
0.00
0.60
0.70
0.80
0.90
1.00

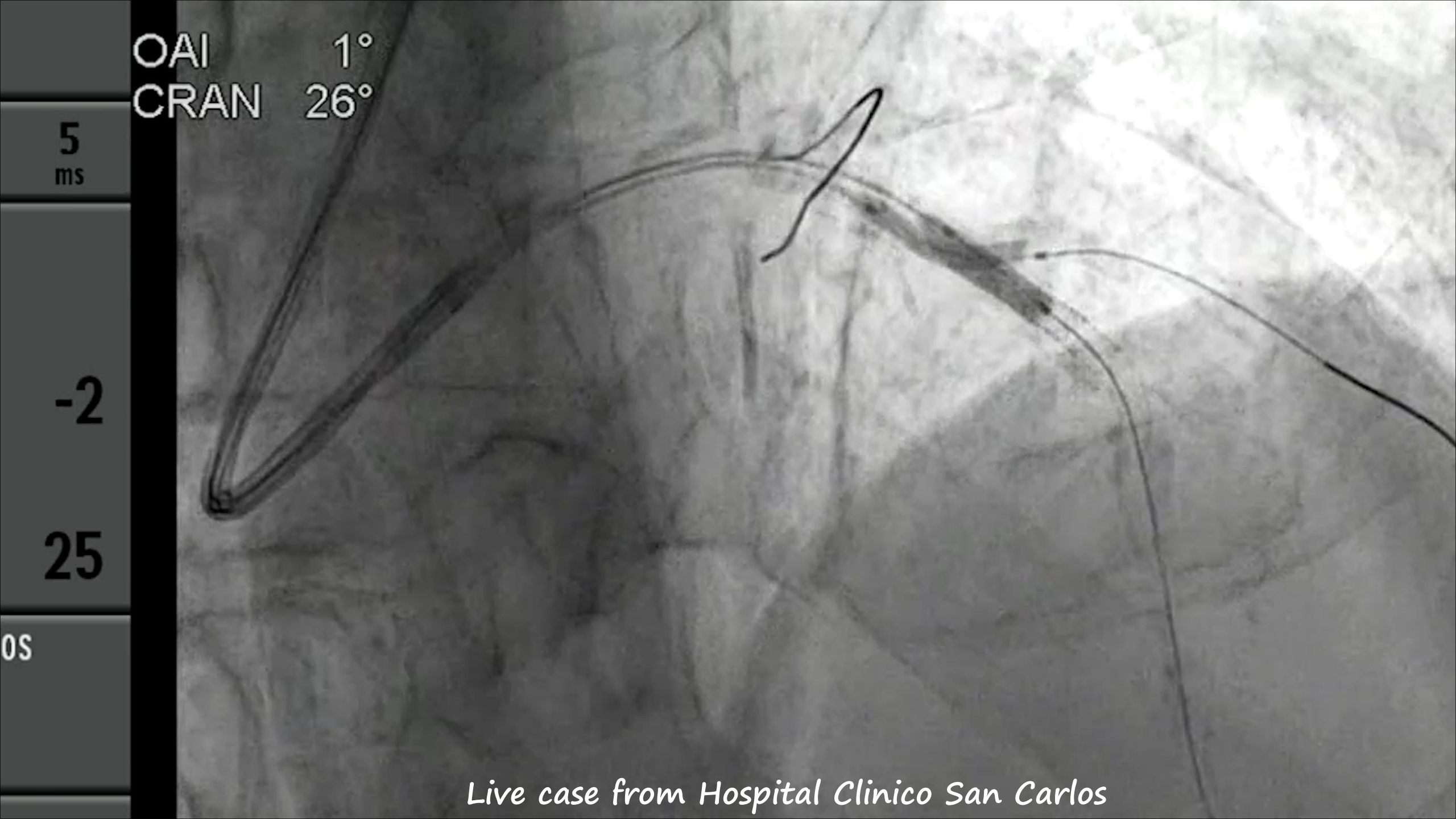


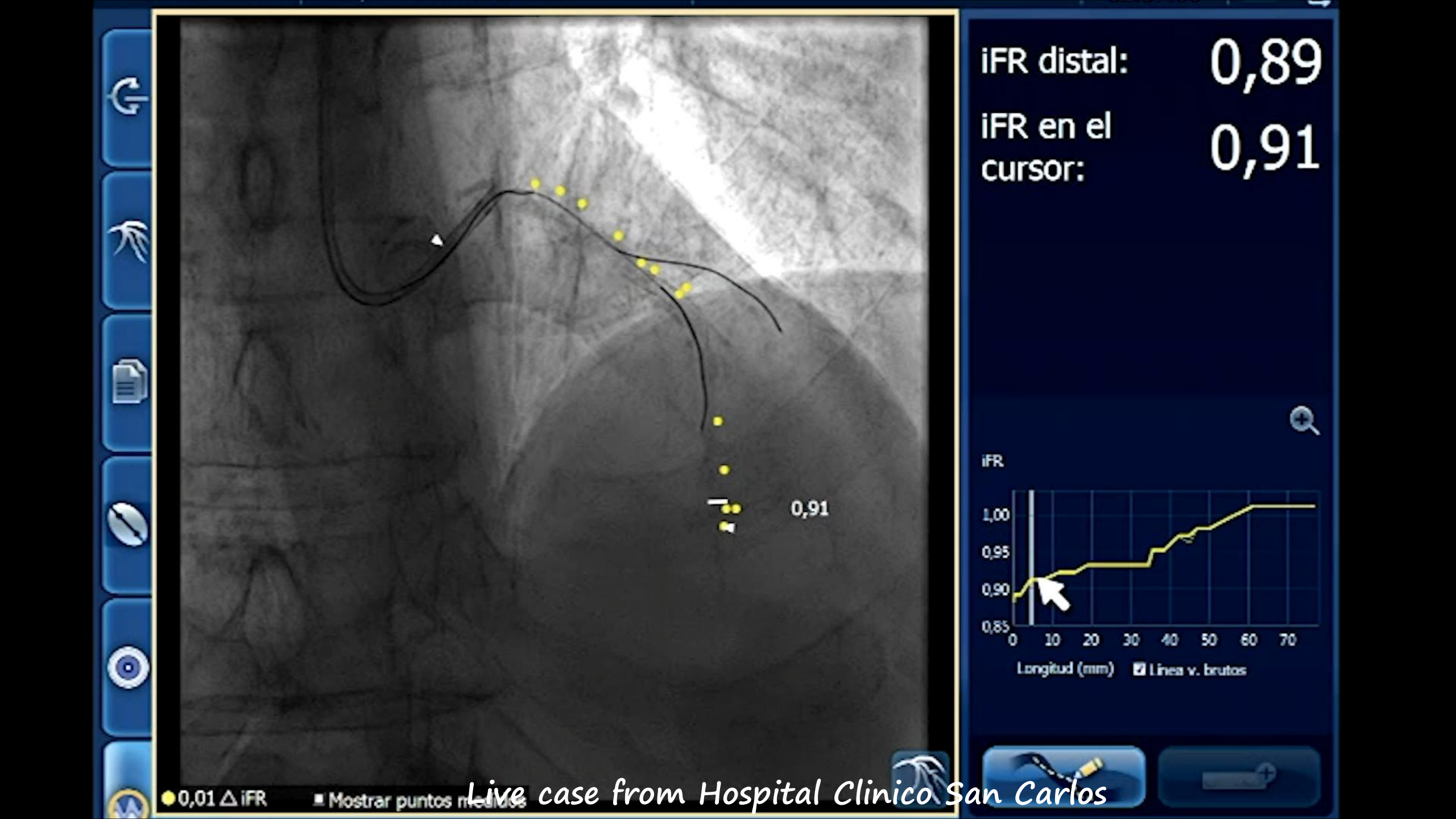
Live case from Hospital Clinico San Carlos





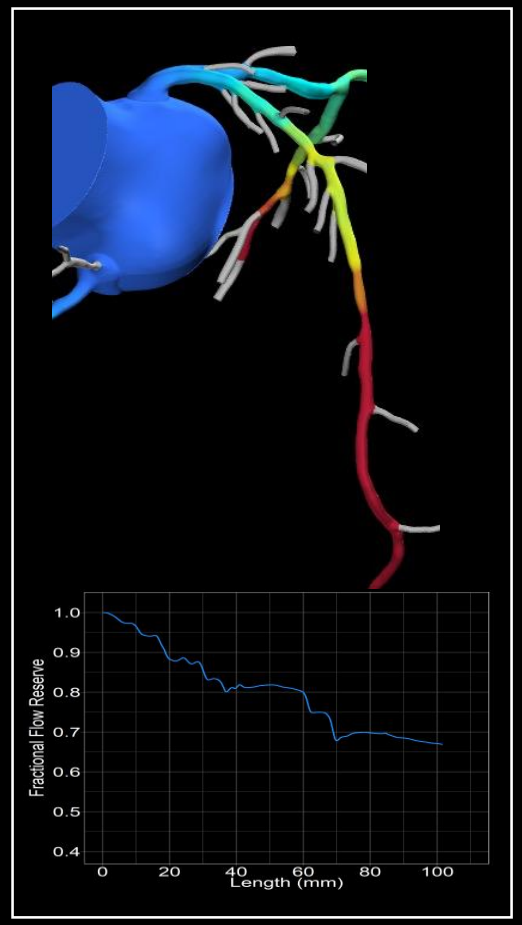
Live case from Hospital Clinico San Carlos

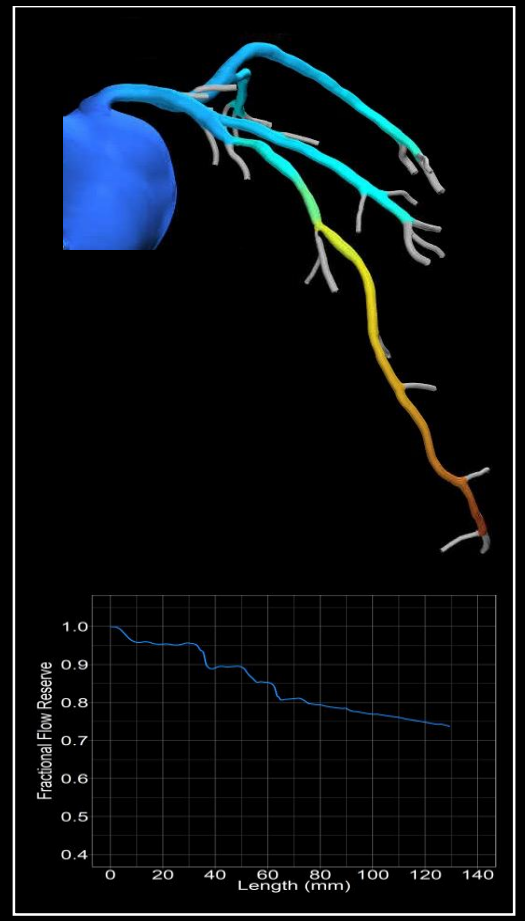

OAI 1°
CRAN 26°
5
ms
-2
25
os
Live case from Hospital Clinico San Carlos

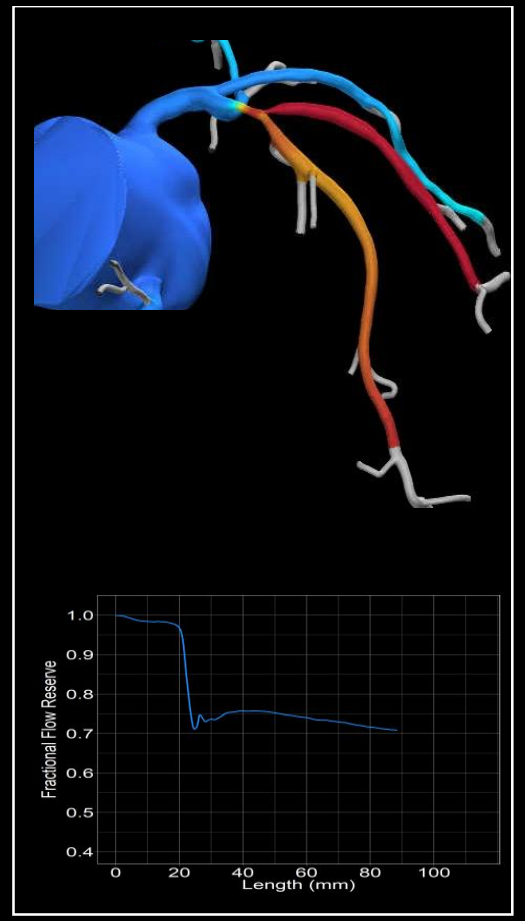


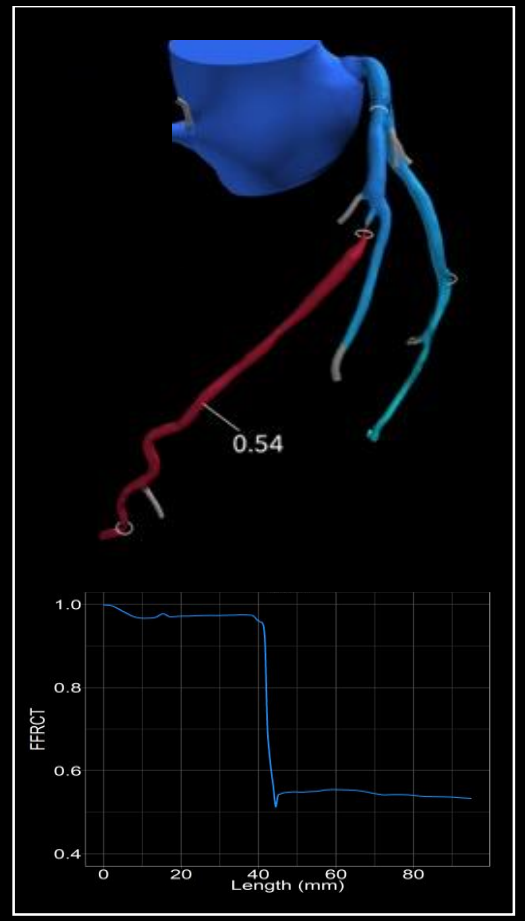
Live case from Hospital Clinico San Carlos

Physiological CAD patterns derived from CT







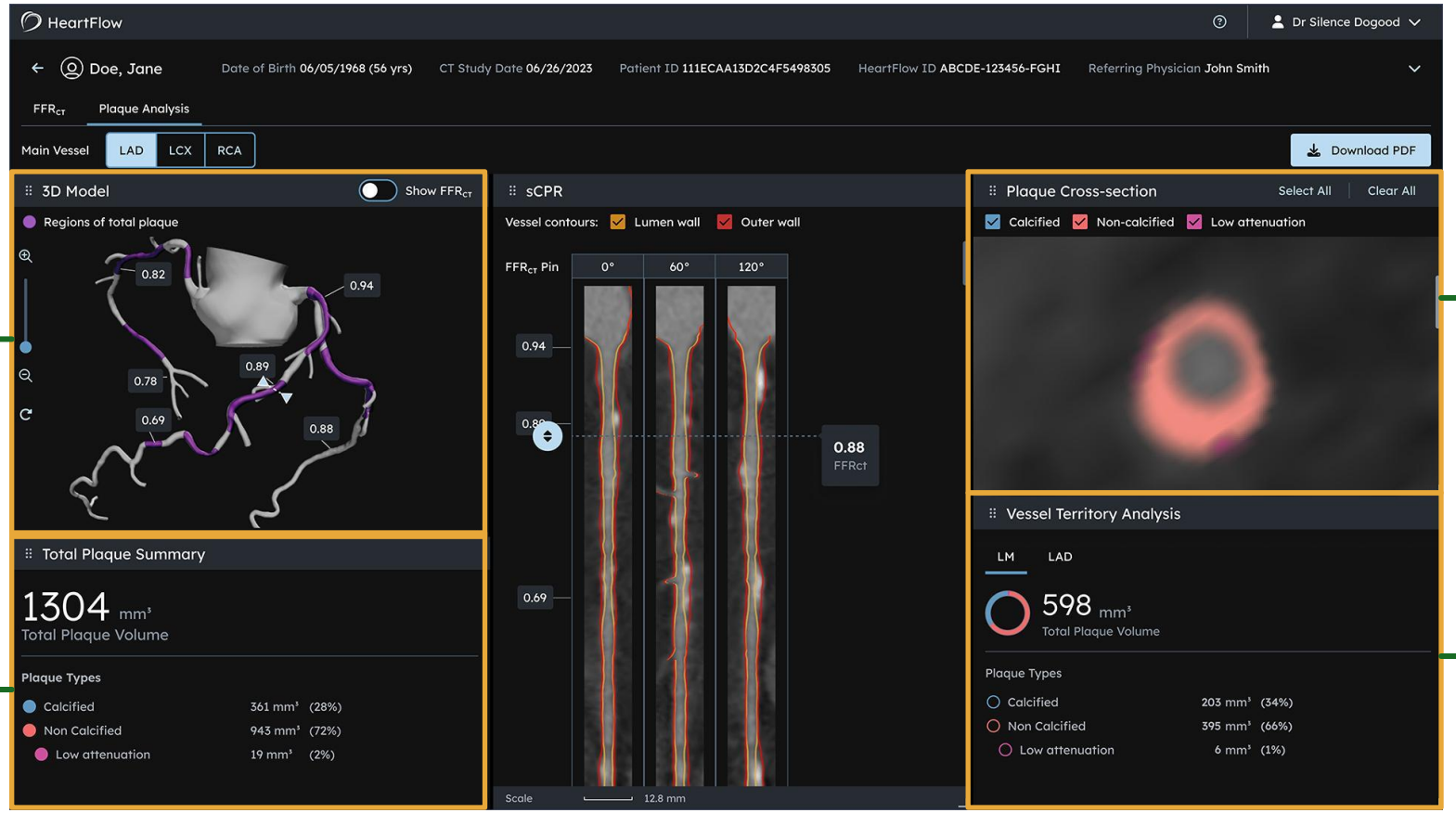


Diffuse CAD — **Focal CAD**

0 ← **PPG** → **1**

Plaque analysis with HeartFlow

1 Interactive model with plaque location, integrated with FFR_{CT} model



2 Coregistered cross-sectional reference and sCPR with plaque by type

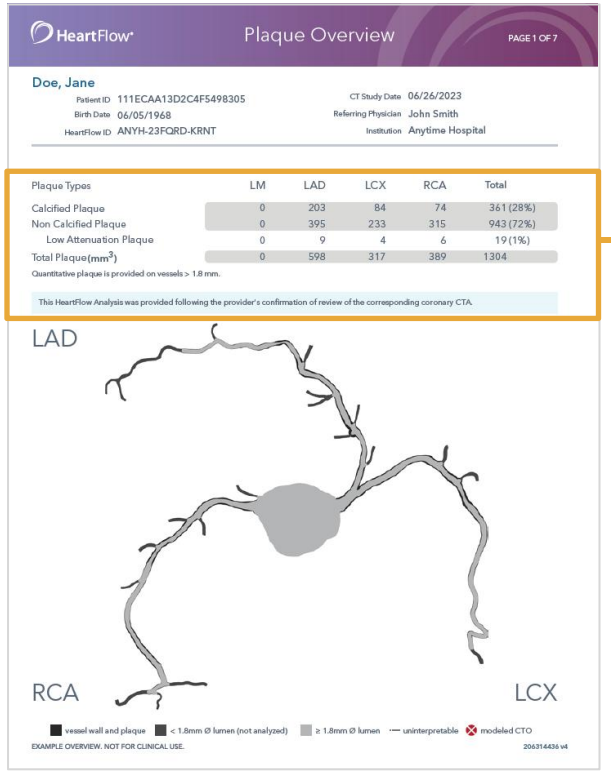
3 Accurate plaque volume across calcified, non-calcified and low attenuation[2]

4 Detailed comprehensive quantification by territory

Mockup for visualization and actual appearance may change and clinical information is for illustrative purposes only. Available as part of HeartFlow software update this Fall for sites with HeartFlow Plaque Analysis. Select features pending regulatory clearance may only be available at a later date.

Plaque volume measured in mm3 in vessels that are >1.8mm in diameter / Narula et al. Eur Heart J 2024. https://doi.org/10.1093/ehjci/jeae115

HeartFlow plaque analysis summary


HeartFlow Plaque Overview PAGE 1 OF 7

Doe, Jane
Patient ID 111ECAA13D2C4F5498305
Birth Date 06/05/1968
HeartFlow ID ANYH-23FQRD-KRNT
CT Study Date 06/26/2023
Referring Physician John Smith
Institution Anytime Hospital

Plaque Types	LM	LAD	LCX	RCA	Total
Calcified Plaque	0	203	84	74	361 (28%)
Non Calcified Plaque	0	395	233	315	943 (72%)
Low Attenuation Plaque	0	9	4	6	19 (1%)
Total Plaque(mm^3)	0	598	317	389	1304

Quantitative plaque is provided on vessels > 1.8 mm.

This HeartFlow Analysis was provided following the provider's confirmation of review of the corresponding coronary CTA.

EXAMPLE OVERVIEW. NOT FOR CLINICAL USE. 206314436 v4

Plaque Types	LM	LAD	LCX	RCA	Total
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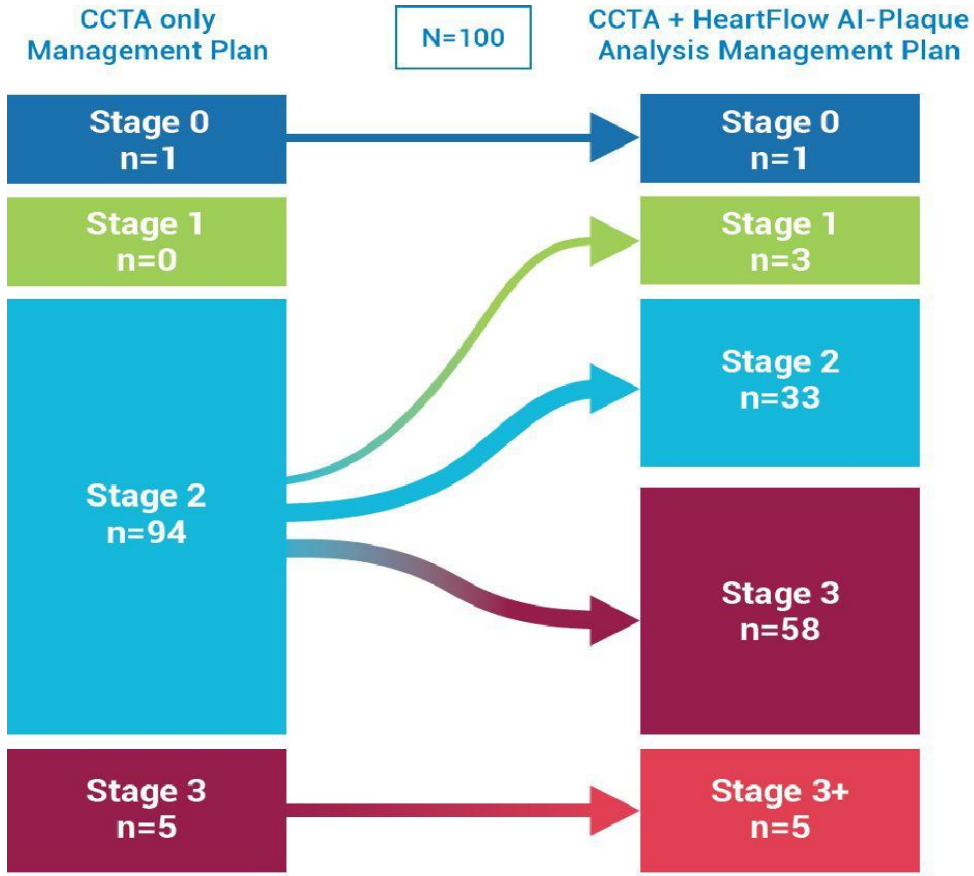
This HeartFlow Analysis was provided following the provider's confirmation of review of the corresponding coronary CTA.

Plaque **volume by type**
(mm3, in vessels that are >1.8mm in diameter)

2D visualization of plaque
location / distribution

DECODE study: Change in medical Tx based on plaque analysis



Stage	Treatment
0	GDMT
1	Low dose statin
2	High-intensity statin
3	High-intensity statin + PCSK-9 inhibitor + additional medications
3+	Escalation of therapy following review of Plaque report if stage 3 was chosen initially

Nearly **50% of patients** with a CAC of 0 were reclassified

Rinehart et al. JSCAI 2024. https://doi.org/10.1016/j.jscai.2024.101296

FFR-CT: ESC CCS guideline recommendations 2024

Recommendations for definition of high risk of adverse events		
The use of one or more of the following test results is recommended to identify individuals at high risk of adverse events: • Exercise ECG: o Duke Treadmill Score < −10; • stress SPECT or PET perfusion imaging: o Area of ischaemia ≥10% of the LV myocardium; • Stress echocardiography: o ≥3 of 16 segments with stress-induced hypokinesia or akinesia; • stress CMR: o ≥2 of 16 segments with stress perfusion defects or ≥3 dobutamine-induced dysfunctional segments; • CCTA: o left main disease with ≥50% stenosis, three-vessel disease with ≥70 stenosis, or two-vessel disease with ≥70% stenosis, including the proximal LAD or one-vessel disease of the proximal LAD with ≥70% stenosis and FFR-CT ≤0.8.	I	B

Virtual PCI can be conducted by combining anatomical information from CCTA with that of FFR-CT. FFR-CT/CCTA-basea virtual PCI has two theoretical advantages over ICA-based virtual PCI: (i) it does not re- quire invasive investigation, and (ii) it provides information on vessel wall/ plaque composition. FFR-CT/CCTA-based virtual PCI has been shown to accurately predict post-PCI FFR and to modify PCI procedural planning in 31% of lesions and 45% of patients.

Muchas gracias por su atención