FFR-CT chez le patient diabétique

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Néanmoins, sujet intéressant !

Diabétiques :

33 % de maladie coronarienne

Cardiovasc Diabetol. 2018; 17: 83

20 % de maladie coronarienne **asymptomatique**

Diabetes Care. 2004; 27: 1954-1961

Guidelines CCS 2019 :

In high-risk asymptomatic adults (with diabetes, a strong family history of CAD, or when previous risk-assessment tests suggest a high risk of CAD), functional imaging or coronary CTA may be considered for cardiovascular risk assessment.	IIb	C

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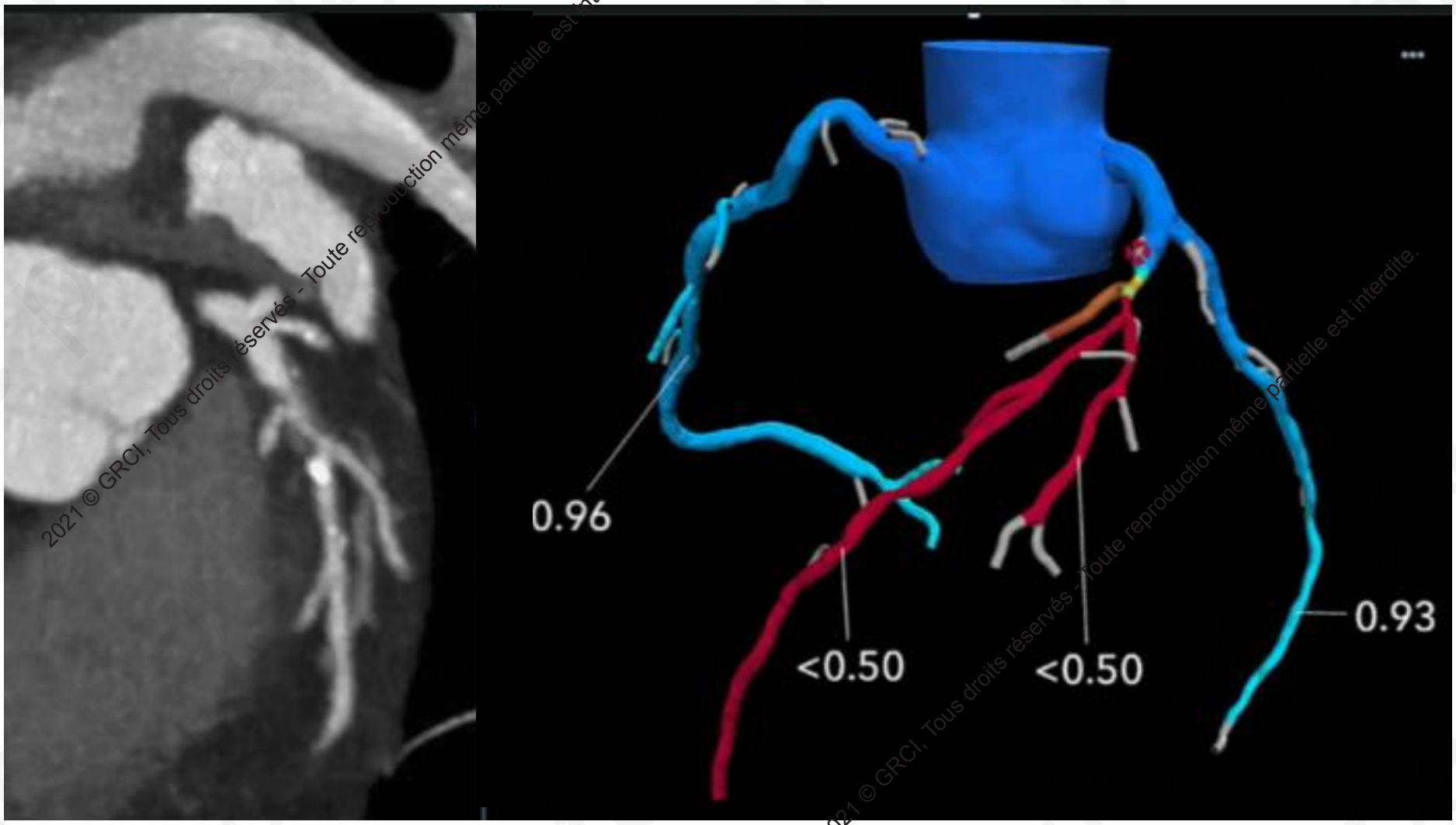

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Quelle modalité ?

PET IRM CT

En 2021…

1

Diabète = Prédicteur indépendant de maladie coronarienne tritronculaire

Circ Cardiovasc Imaging. 2019;12:e007940.

En 2021…

Maladie tritronculaire….

= souvent CABG !

2

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	CABG		PCI	
Three-vessel CAD with diabetes mellitus				
Three-vessel disease with low SYNTAX score 0–22.[102,105,121,123,124,135,150–157]	I	A	IIb	A
Three-vessel disease with intermediate or high SYNTAX score (>22).[c] [102,105,121,123,124,135,150–157]	I	A	III	A

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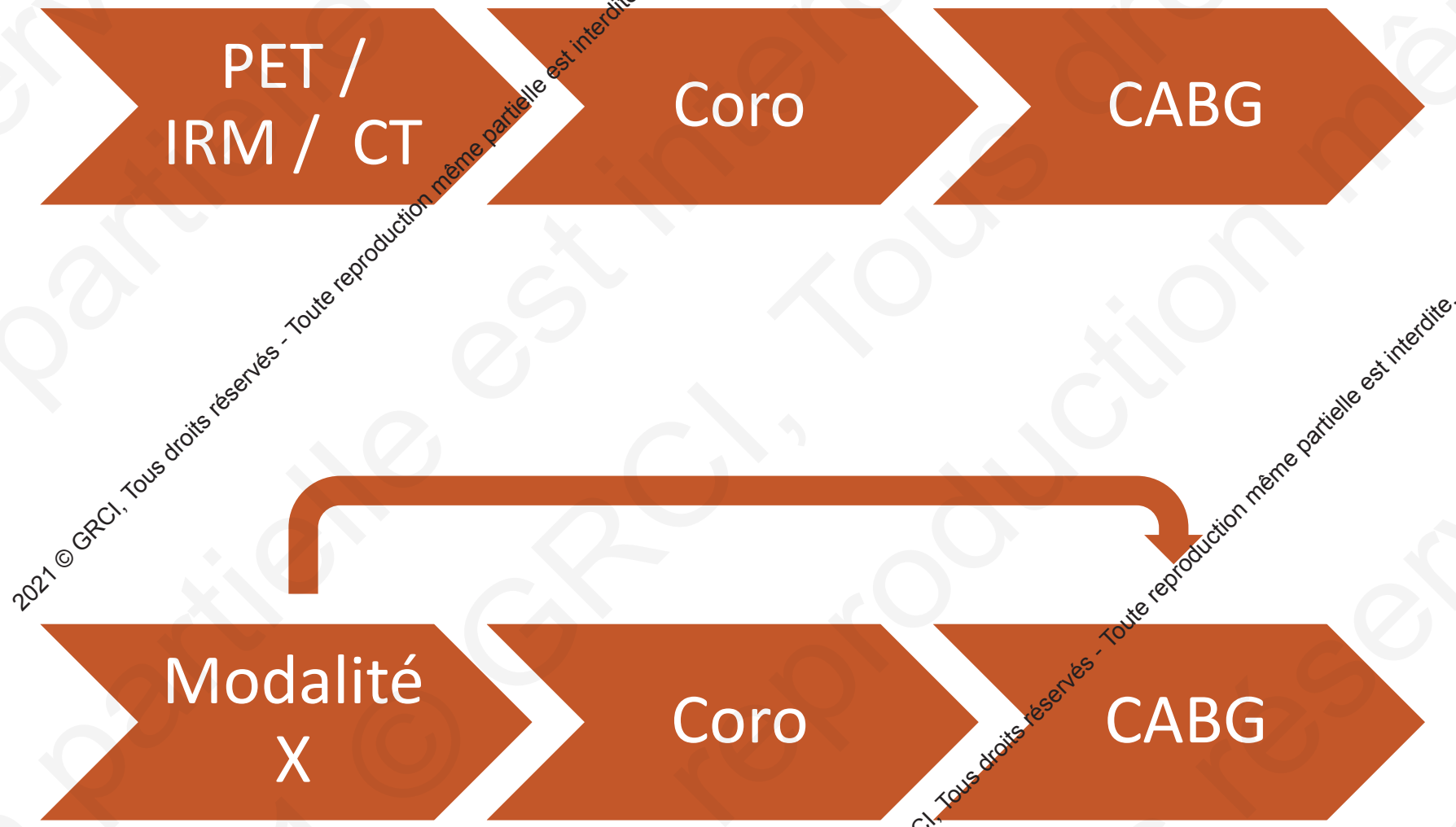

Questions pour la modalité X ?

1) *Est-ce qu'il y a des lésions ?*
2) *Est-ce que ces lésions sont significatives ?*
3) *Traitement médicamenteux, PCI, ou CABG ?*

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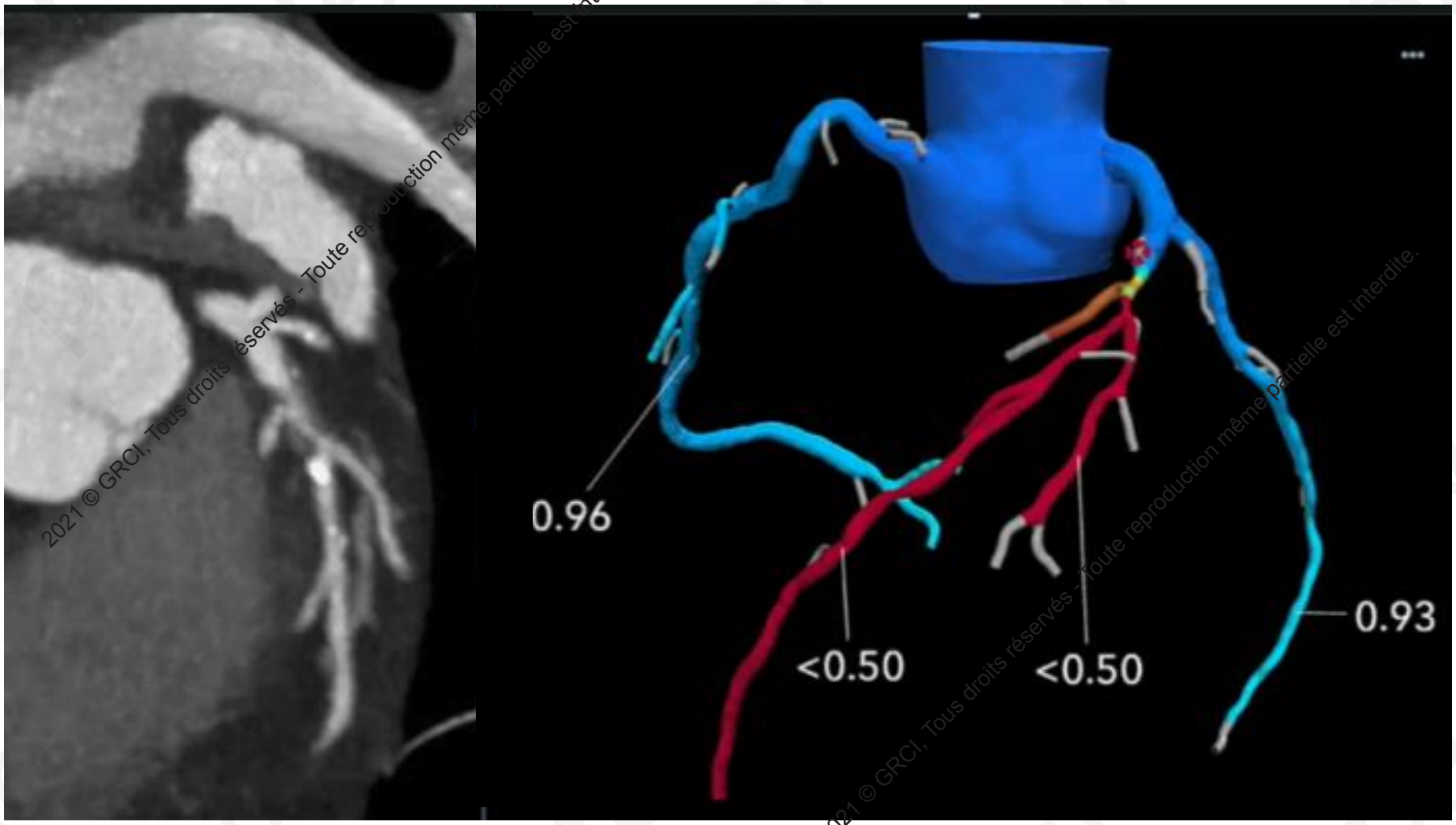

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Coronary computed tomography angiography for heart team decision-making in multivessel coronary artery disease

Carlos Collet[1,2†], Yoshinobu Onuma[3,4†], Daniele Andreini[5], Jeroen Sonck[2], Giulio Pompilio[5], Saima Mushtaq[5], Mark La Meir[6], Yosuke Miyazaki[3], Johan de Mey[7], Oliver Gaemperli[6], Ahmed Ouda[8], Juan Pablo Maureira[9], Damien Mandry[10], Edoardo Camenzind[11], Laurent Macron[12], Torsten Doenst[13], Ulf Teichgräber[14], Holger Sigusch[15], Taku Asano[1], Yuki Katagiri[1], Marie-angele Morel[3], Wietze Lindeboom[4], Gianluca Pontone[5], Thomas F. Lüscher[8,16], Antonio L. Bartorelli[5,17]*, and Patrick W. Serruys[16]*; for the SYNTAX III REVOLUTION investigators

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Primary endpoint. Treatment recommendation based on anatomical assessment and patients' clinical characteristics.

Heart team randomized to coronary CT angiography

Anatomical SYNTAX Score 24 points

SYNTAX score II treatment recommendation

Equipoise CABG or PCI.

Treatment decision

CABG

Left mammary artery to LAD
Saphenous vein graft to the marginal branch (LCX)
Saphenous vein graft to the RCA

Heart team randomized to conventional coronary angiography

Anatomical SYNTAX Score 17 points

SYNTAX score II treatment recommendation

Equipoise CABG or PCI.

Treatment decision

CABG

Left mammary artery to LAD
Saphenous vein graft to the marginal branch (LCX)

Secondary endpoint. Non-invasive anatomical and functional assessment combined with clinical characteristics (SYNTAX Score III)

Non-invasive Functional SYNTAX Score 19 points

SYNTAX score III treatment recommendation

Equipoise CABG or PCI.

Treatment decision

CABG

Left mammary artery to LAD
Saphenous vein graft to the marginal branch (LCX)

- Agreement concerning treatment decision : High (Cohen’s kappa 0.82, 95% confidence interval 0.74–0.91).

- Agreement on the coronary segments to be revascularized 80%.

- FFR derived from coronary CTA changed the treatment decision in 7% of the patients.

Questions pour la modalité X ?

1) *Est-ce qu'il y a des lésions ?*
2) *Est-ce que ces lésions sont significatives ?*
3) *Traitement médicamenteux, PCI, ou CABG ?*

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PPG

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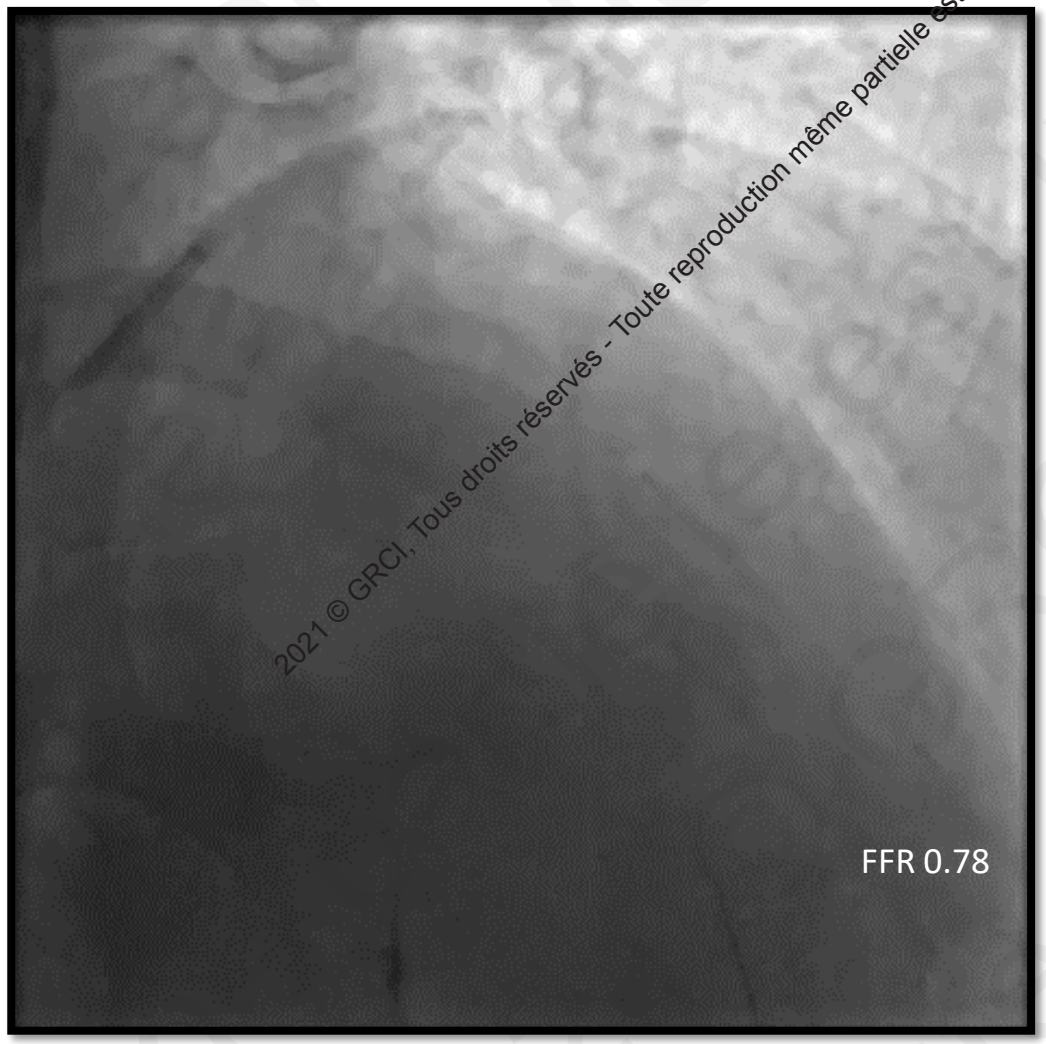
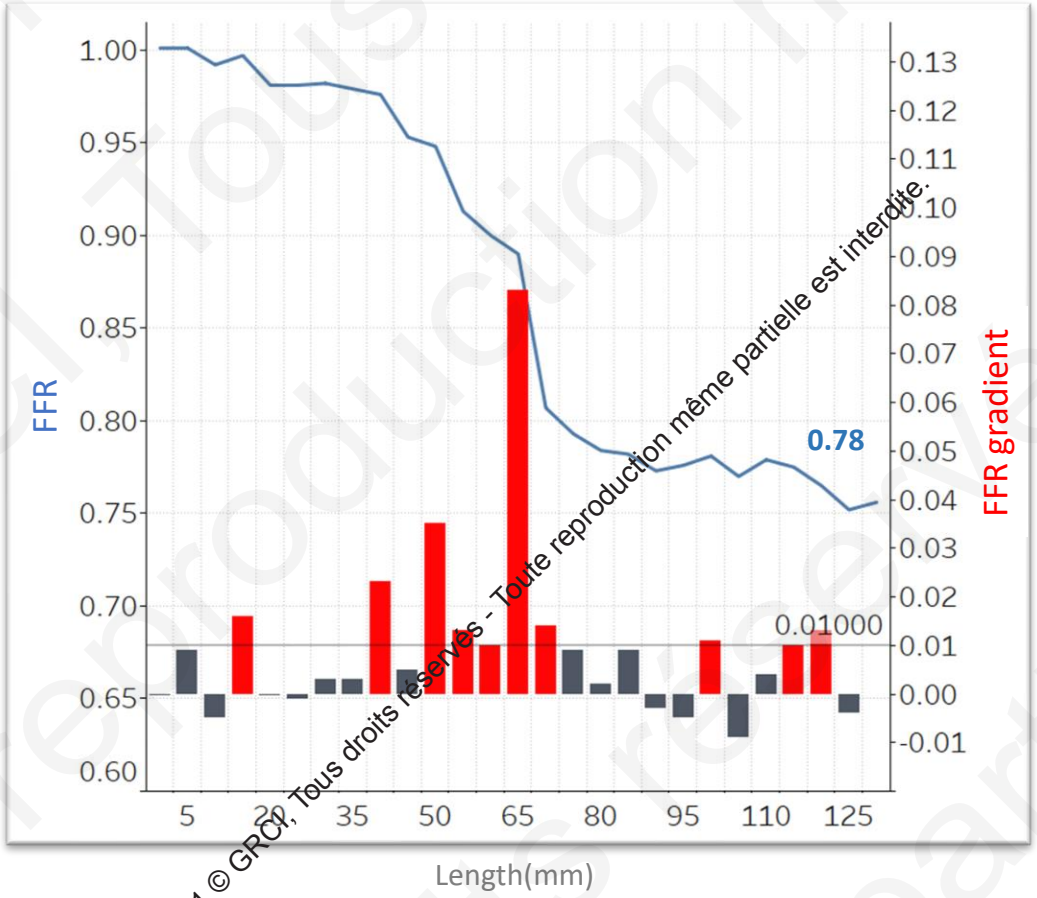
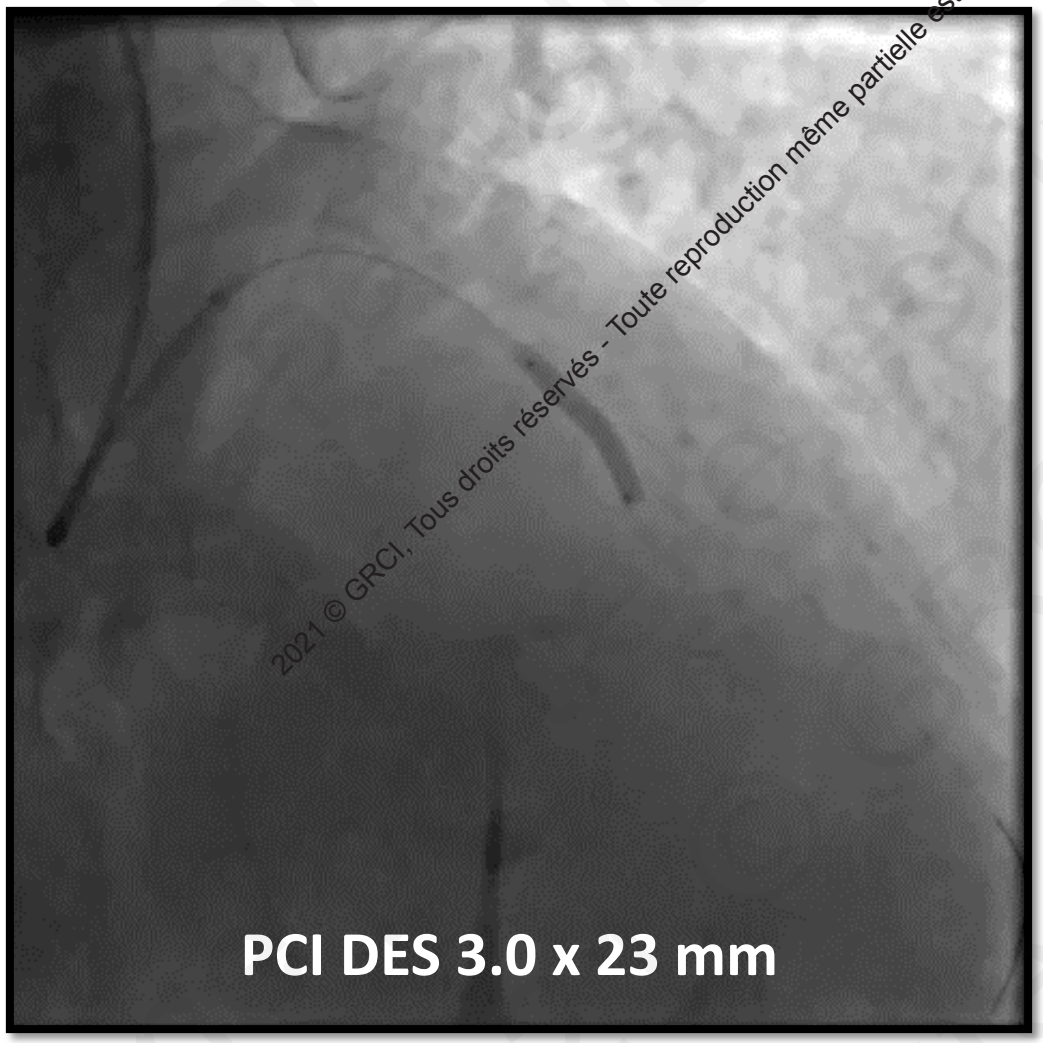


Motorized FFR with n=12800 values



Male, 51 years old. Post PCI for RCA (STEMI, 2 month ago). BMI 31.8kg/m2. CrCl 152ml/min (Cr 0.75 mg/dL). LVEF 60%. Elective PCI for LAD



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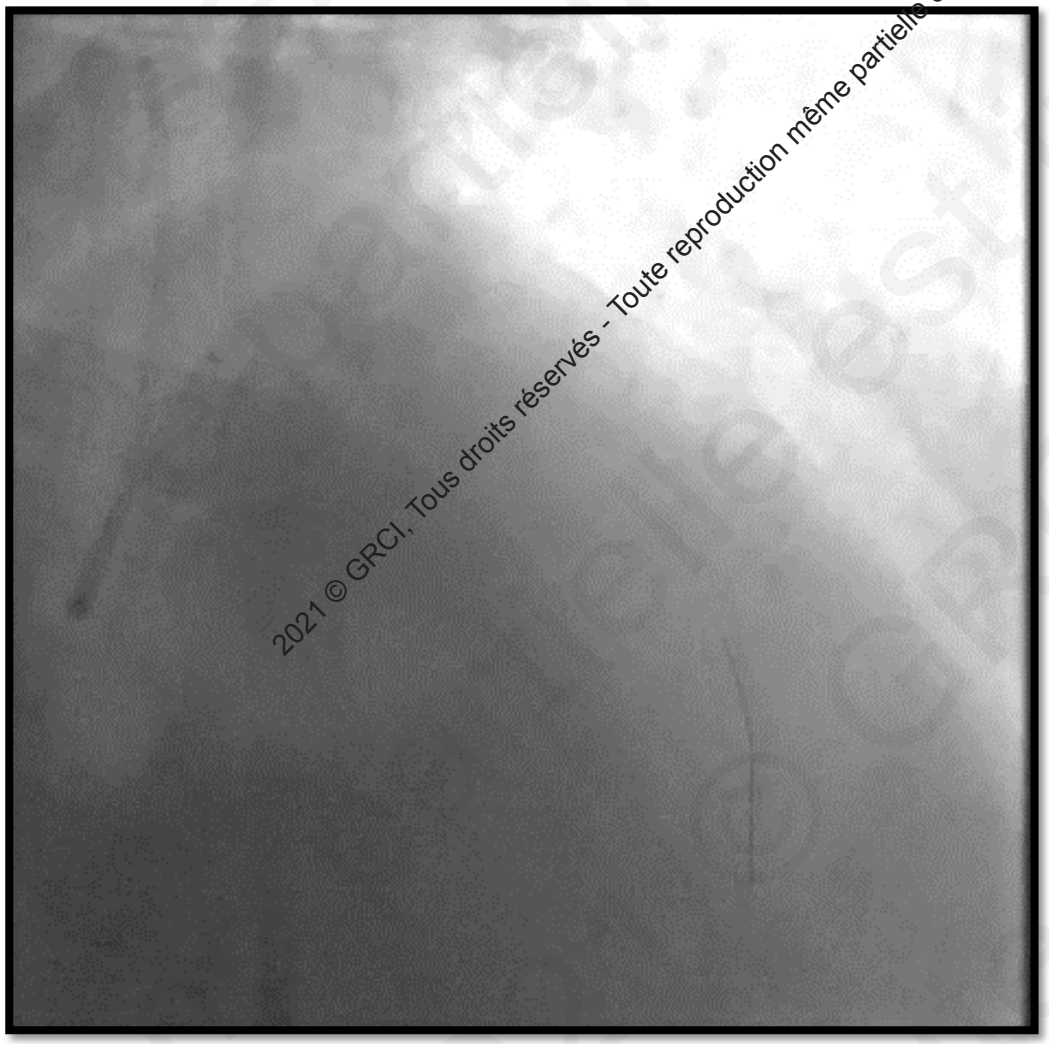
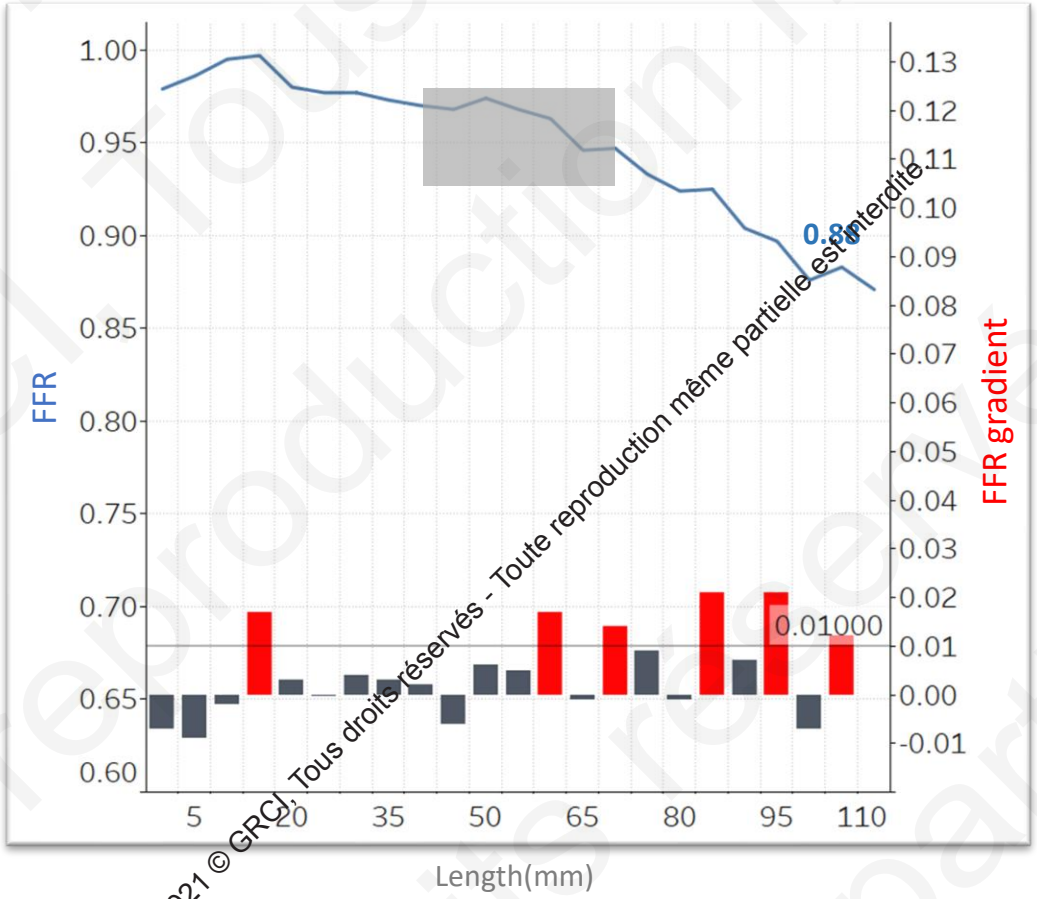
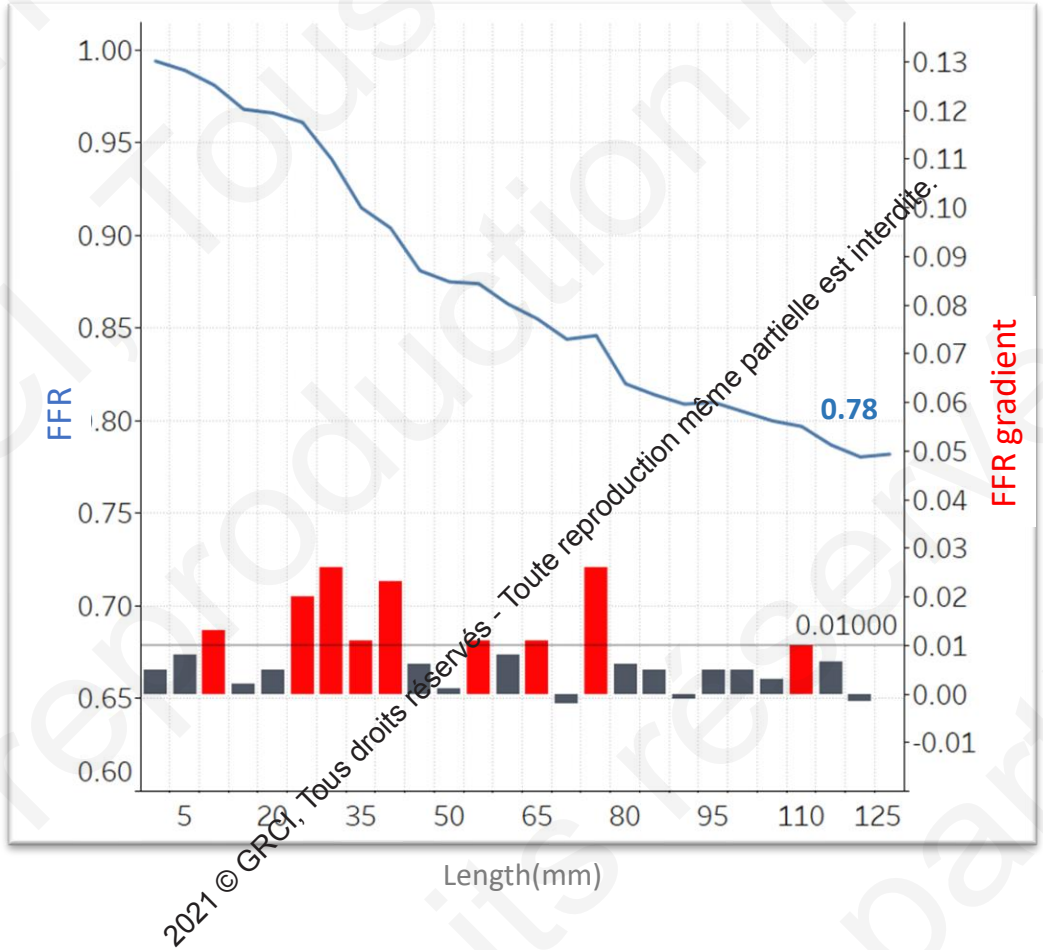
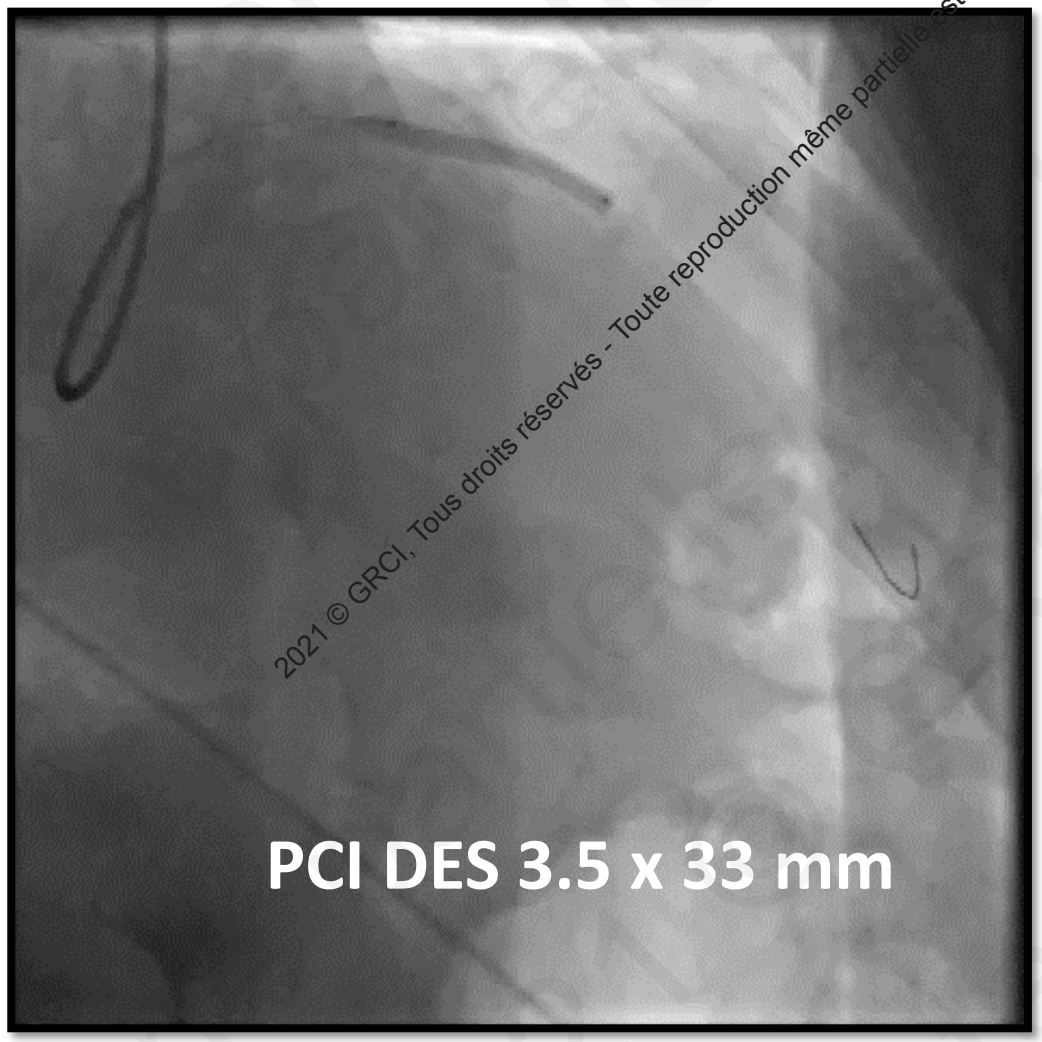




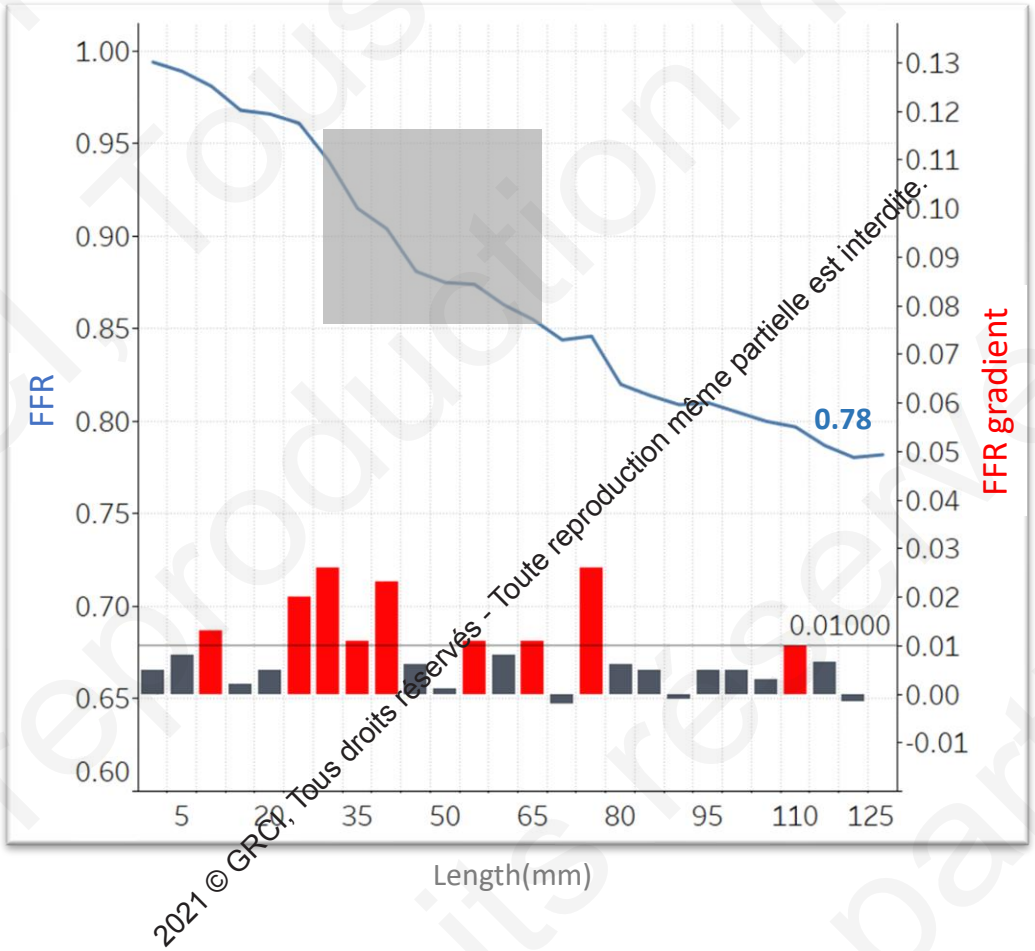
Motorized FFR with n=12500 values

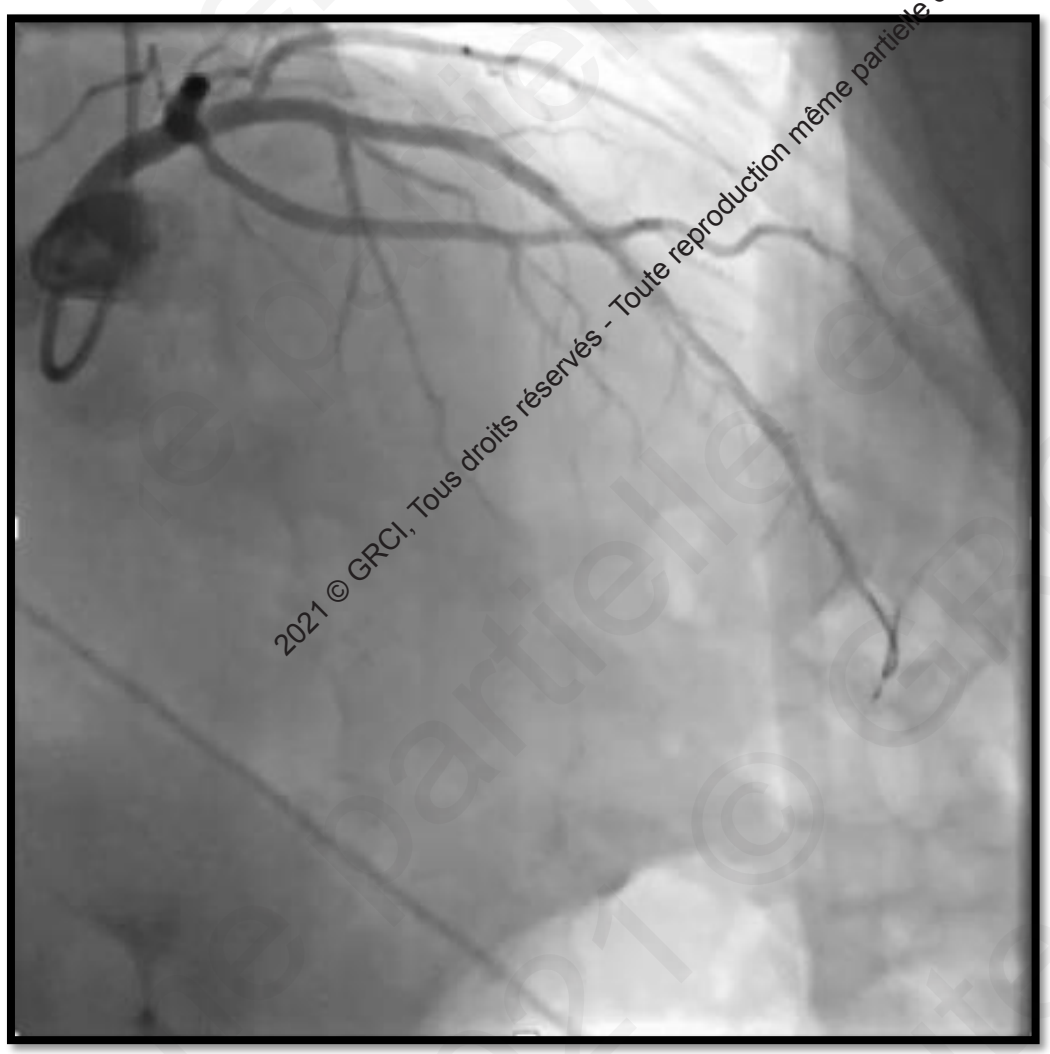


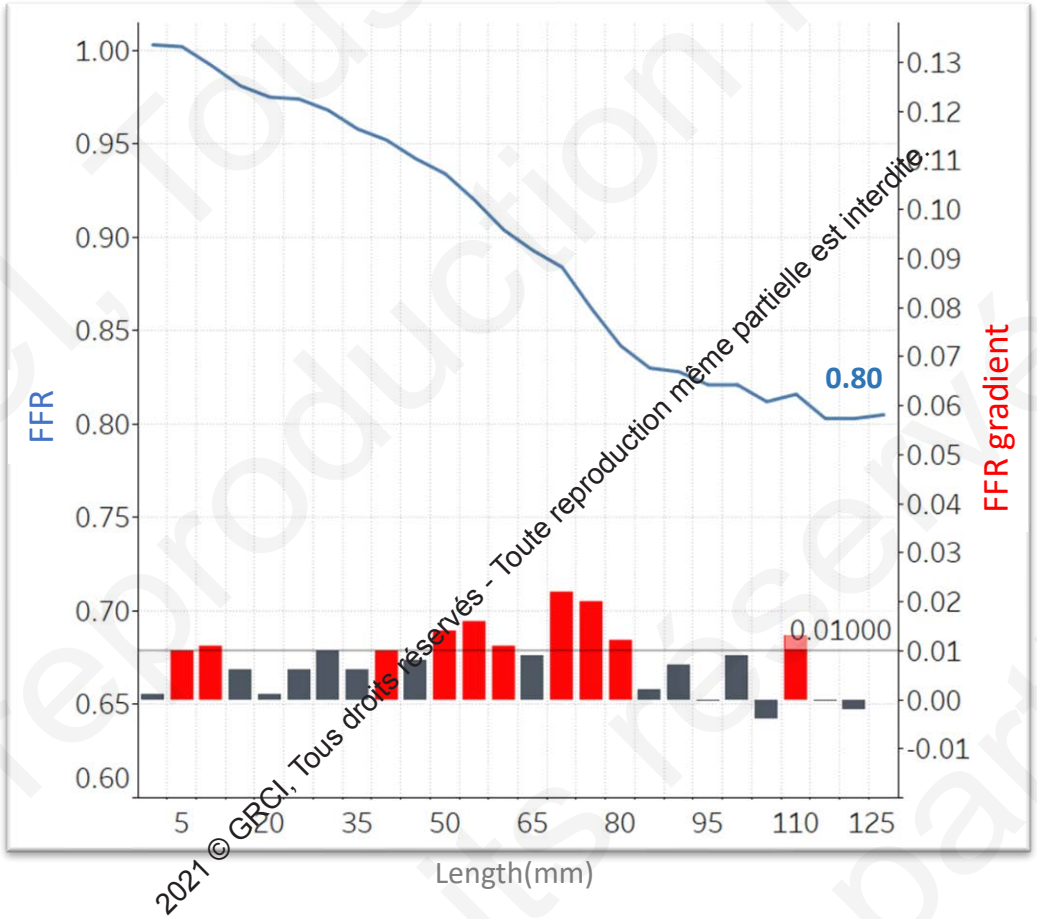
Male, 61 years old. Hypertension, Hyperlipidemia. BMI 27.7kg/m2. CrCl 115ml/min (Cr 0.86



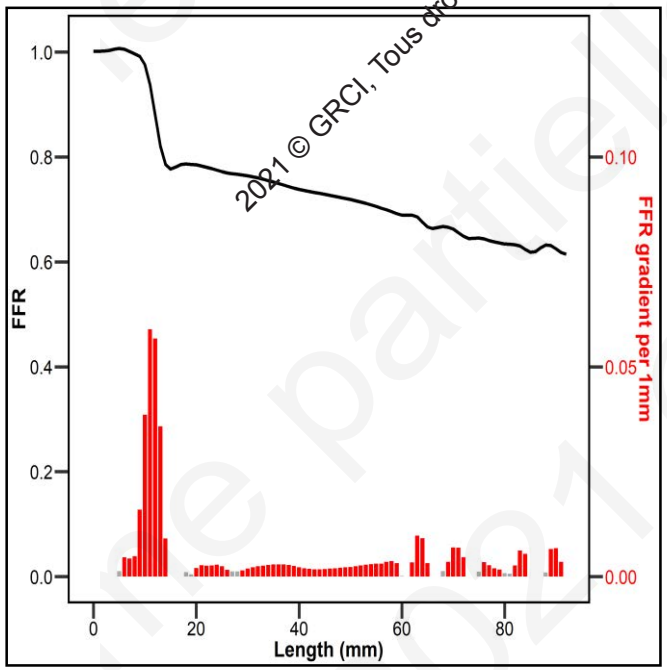
ΔFFR = 0.10







$$PPG_{index} = \frac{\frac{\text{Maximal PPG over 20 mm}}{\text{Vessel FFR gradient}} + \left(1 - \frac{\text{Length with functional disease}}{\text{Vessel length}}\right)}{2}$$

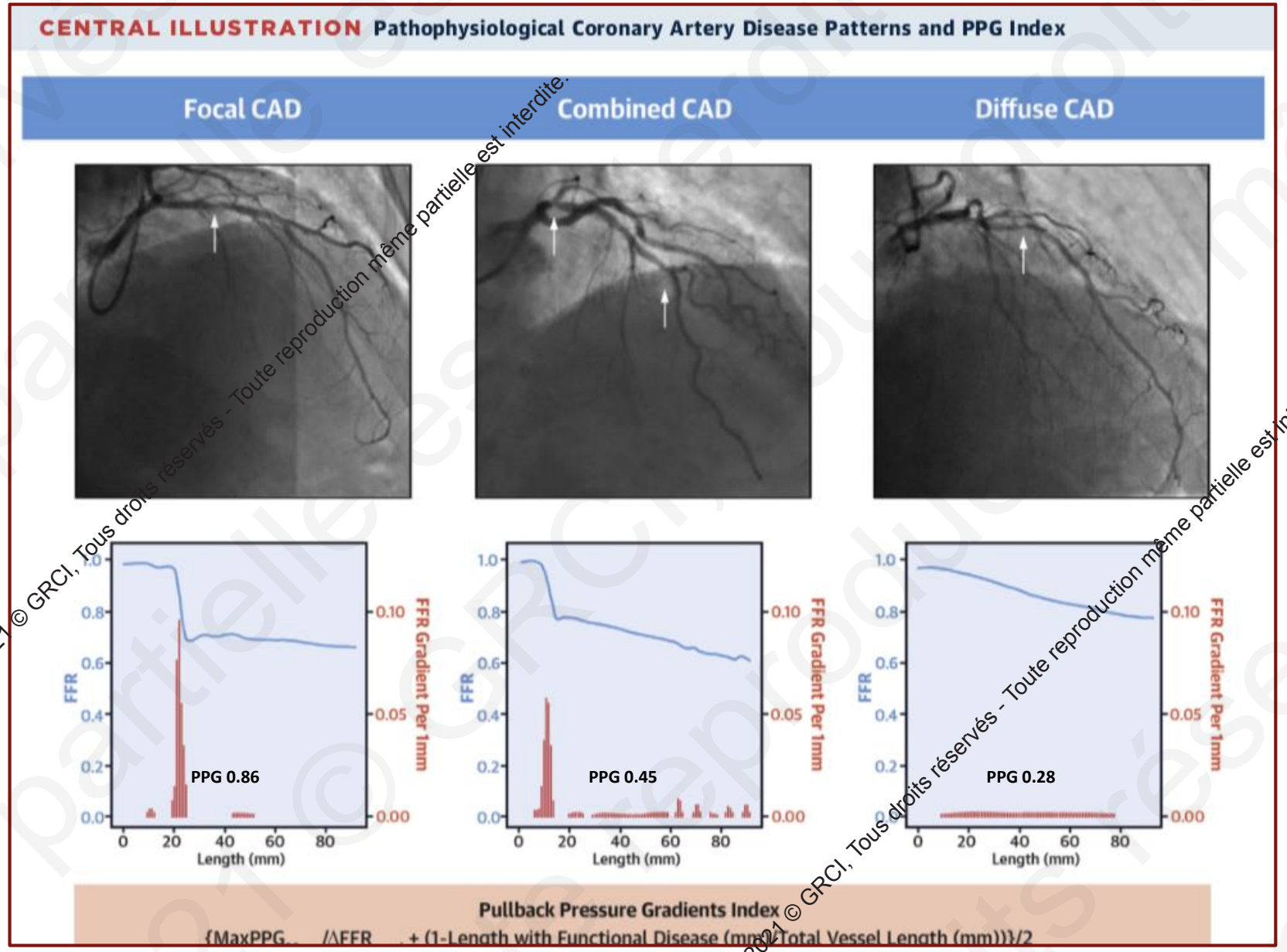


Maximal PPG over 20 mm: Maximum FFR gradient over 20 mm.

Vessel FFR: Difference between FFR values obtained at the ostium of the vessel and the most distal anatomical location.

Length with functional disease: Length of coronary artery in millimetres with FFR drop ≥0.0015 FFR units.

Vessel length: Length from the ostium to the most distal pressure wire location.



J Am Coll Cardiol . 2019 Oct 8;74(14):1772-1784.

Et le FFR-CT ?

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P3 trial

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CT + FFR-CT

Coronarographie

FFR (pull-back) / OCT

PCI

Re-OCT

FFR (pull-back)

Virtual PCI

Virtual FFR (PB)

P3 Case Presentation

Case: BE-OLV-00005

Clinical Characteristics

Age 68 yrs, male, BMI 33.7 kg/m²

Medical history: Hypertension, Hypertension, **Diabetes**, ex-smoker

Echo EF 60%. Creatinine 1.01 mg/dl

CT acquisition

Siemens SOMATOM Force

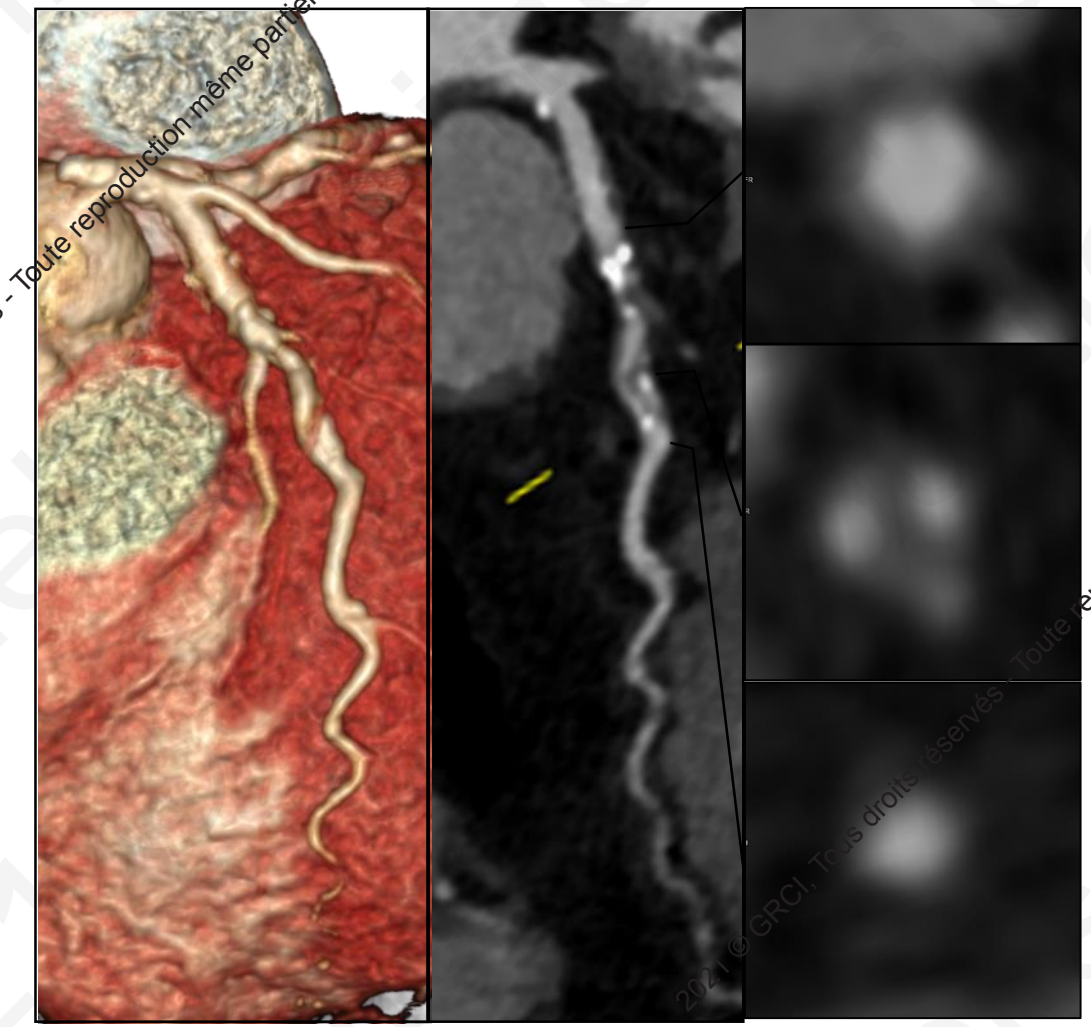
HR 53 /min

Nitrates: Nitroglycerin spray 0.8 mg (0.4mg x2)

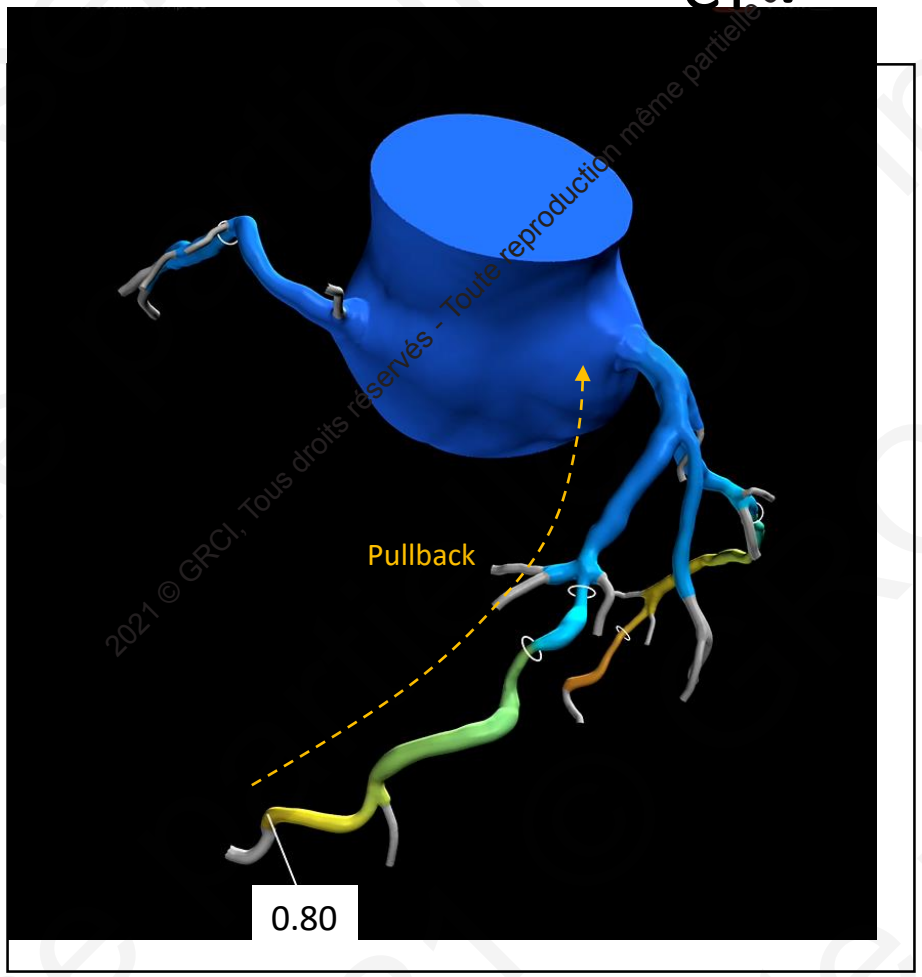
Radiation dose: Total DLP 854mGycm

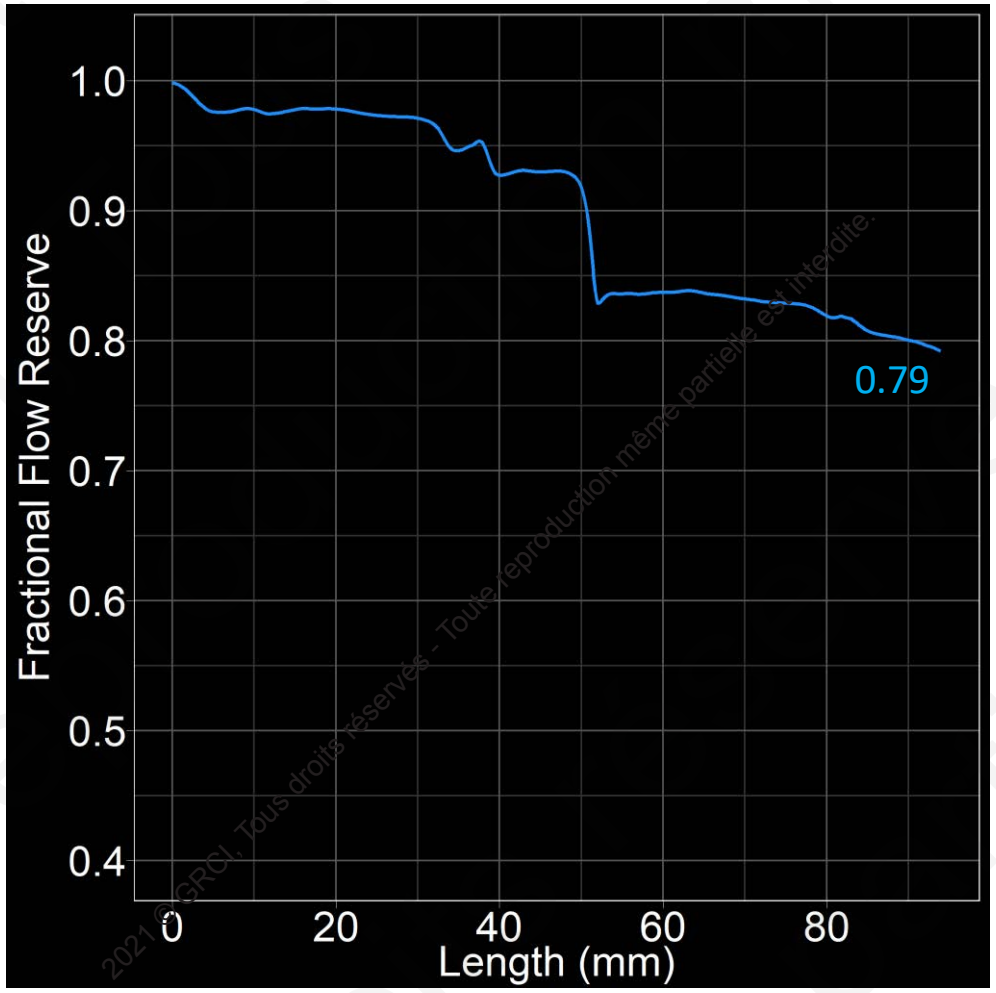
Contrast: 120ml (Lomeron®350)

Coronary CTA

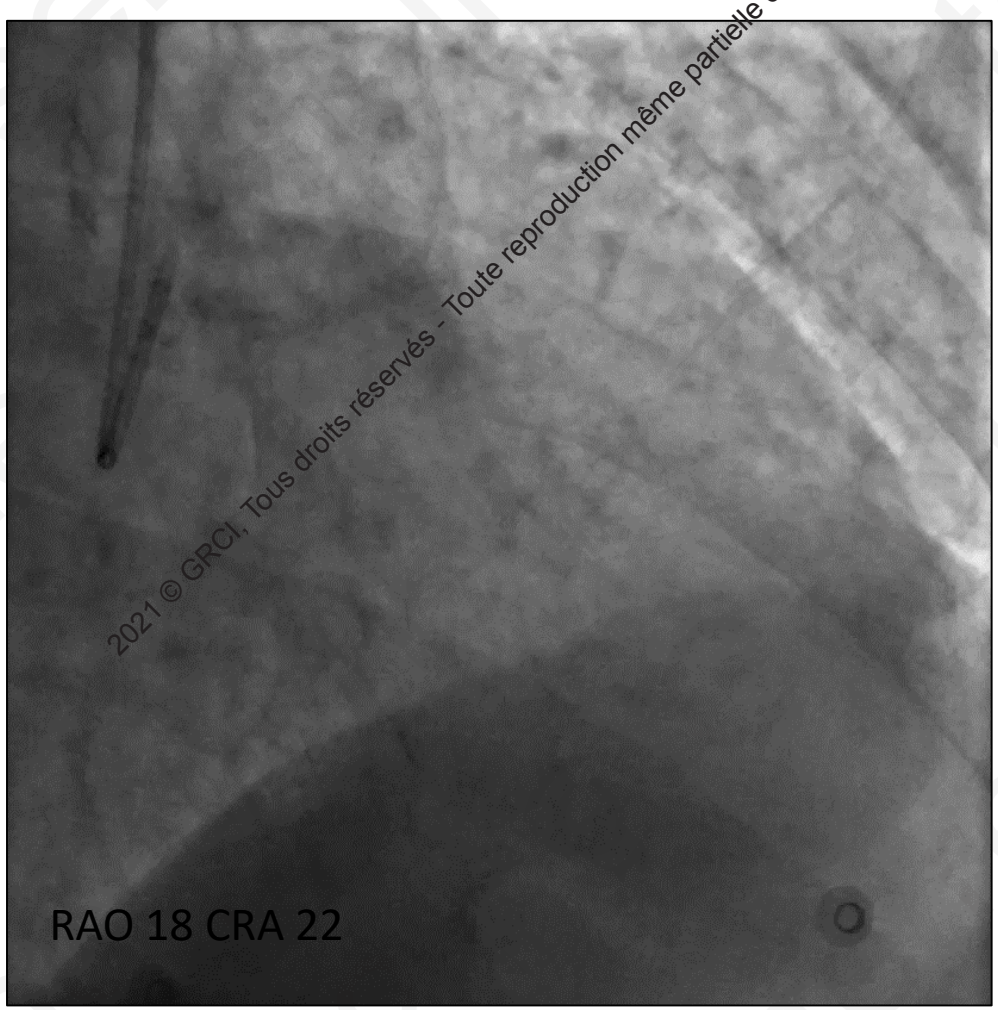


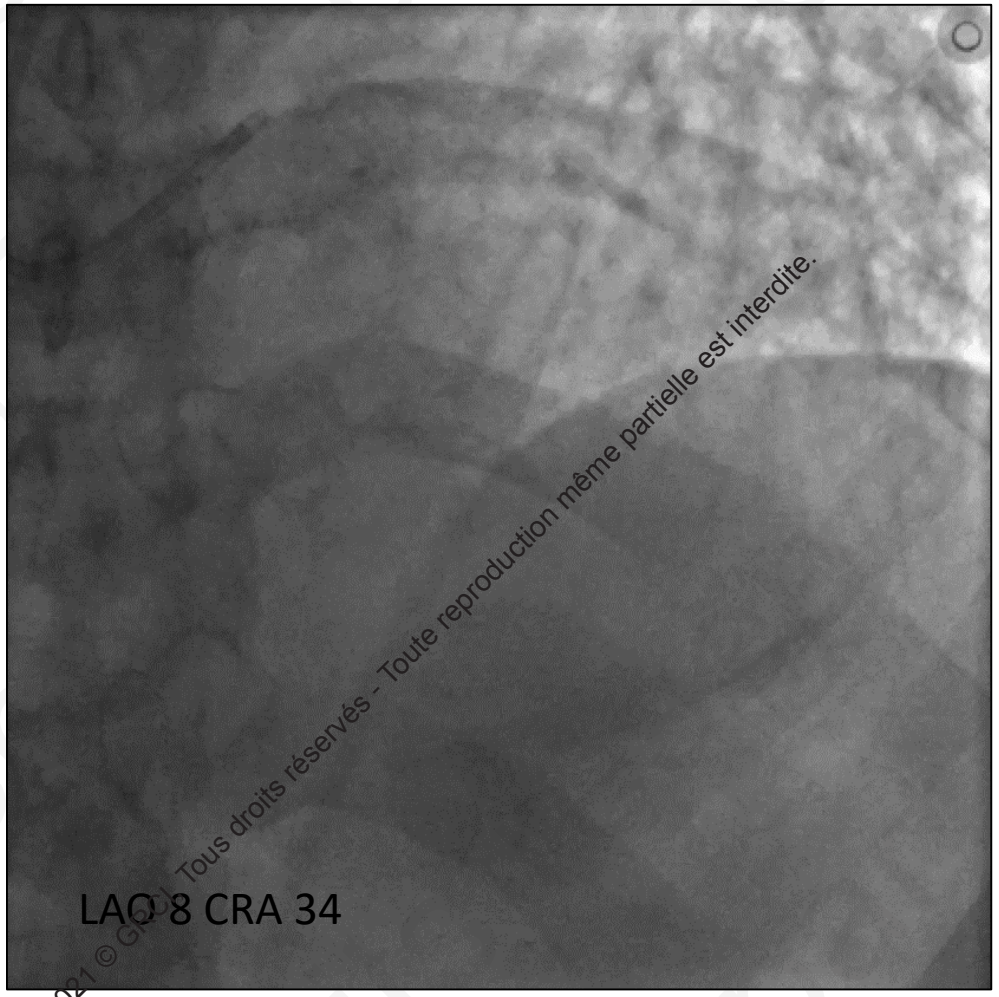
FFR_{CT} pullback pre PCI





Conventional angiography





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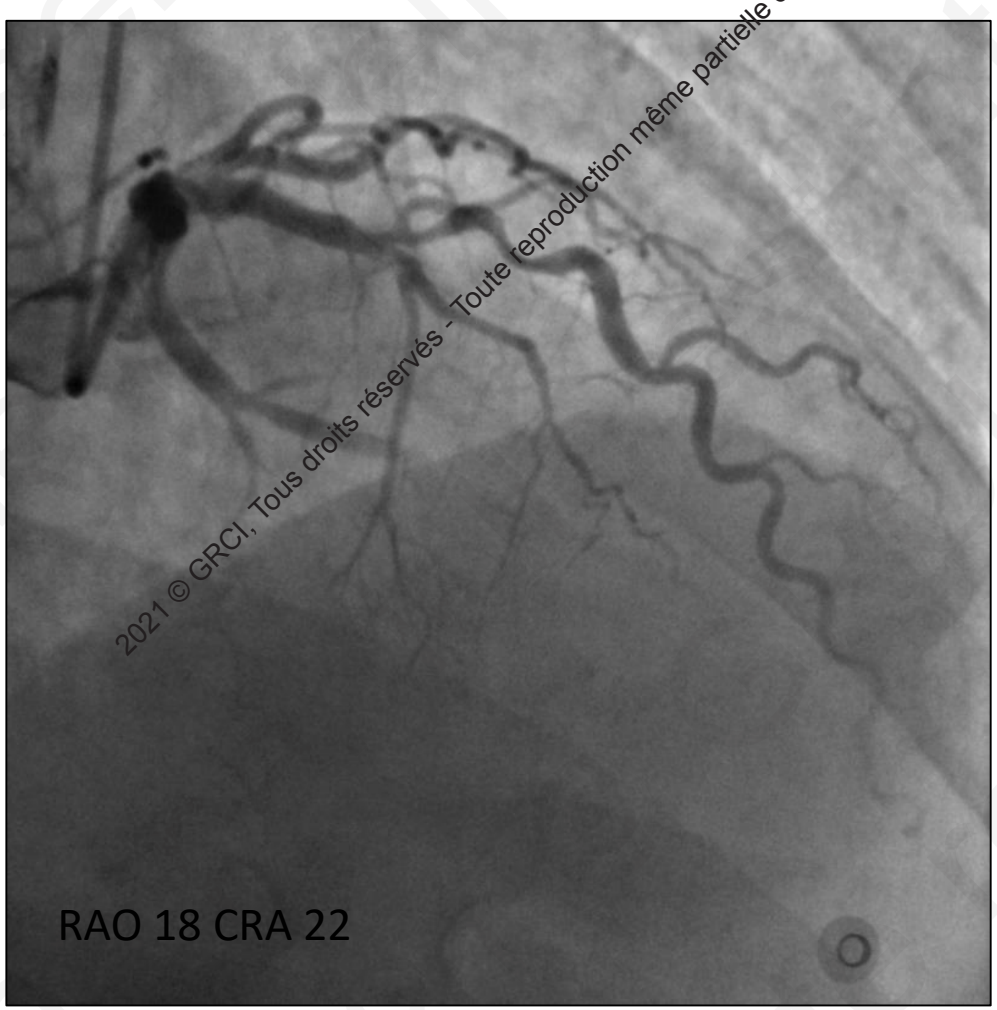
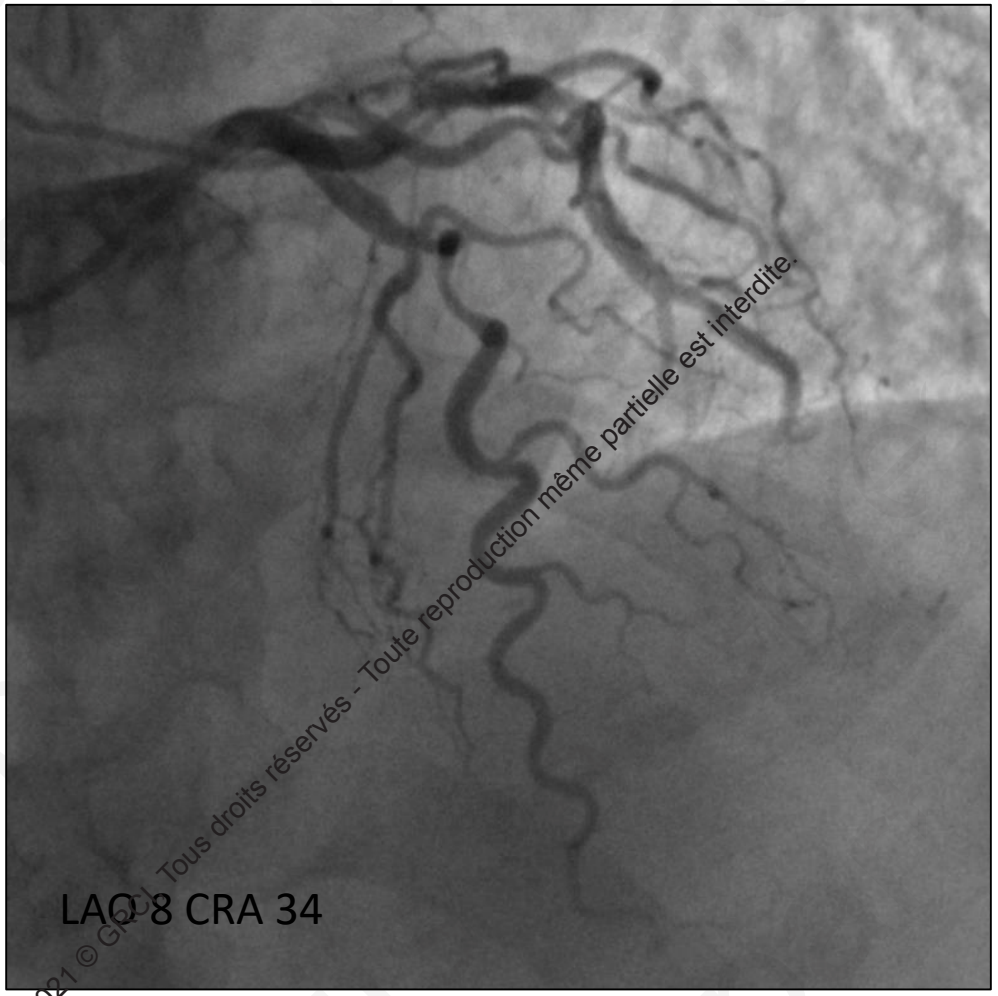
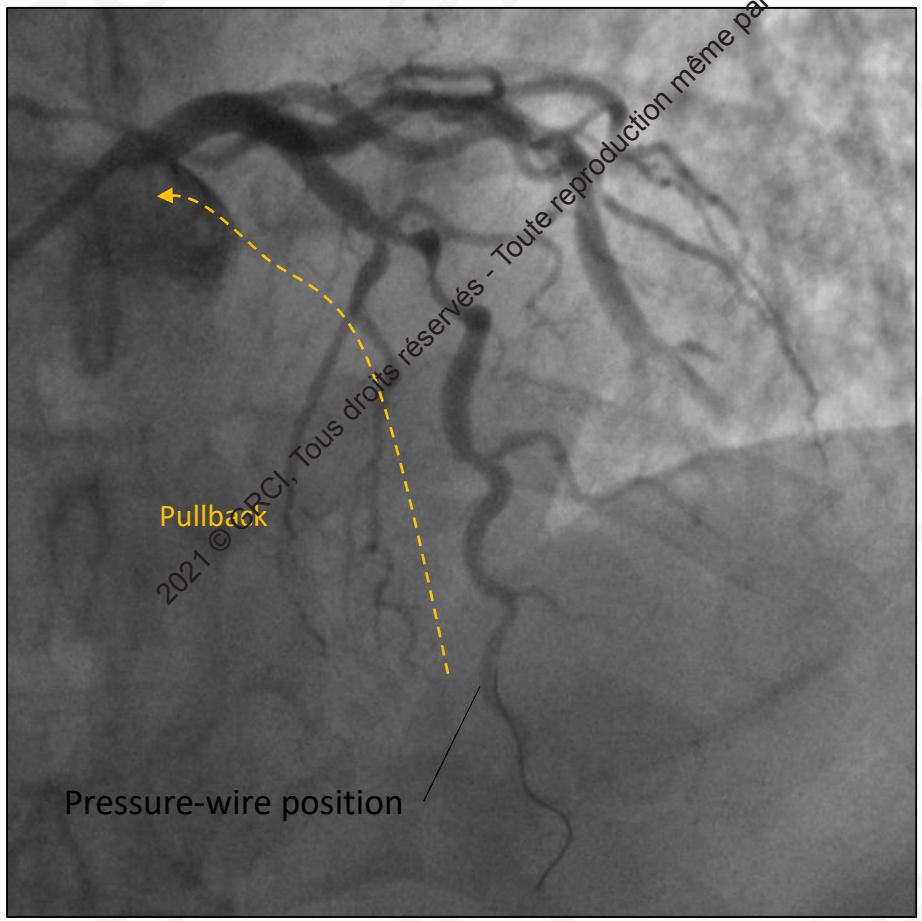
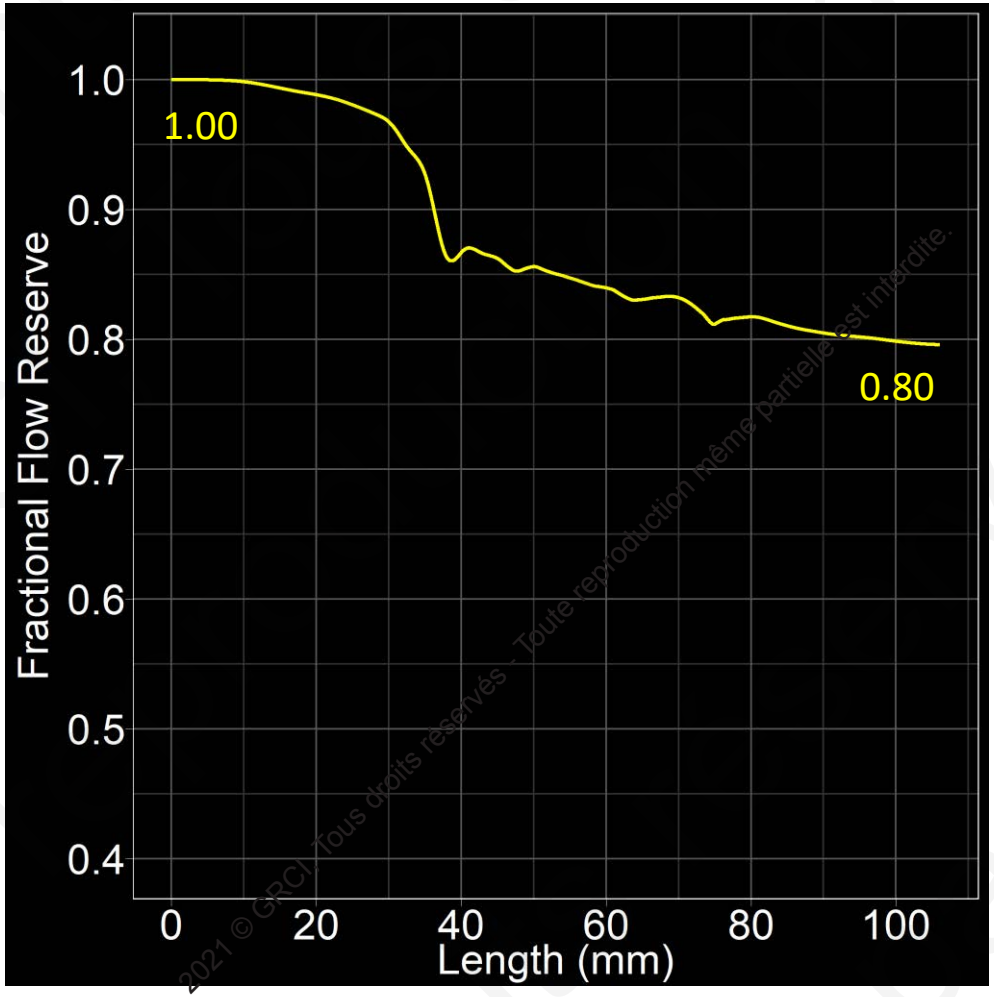




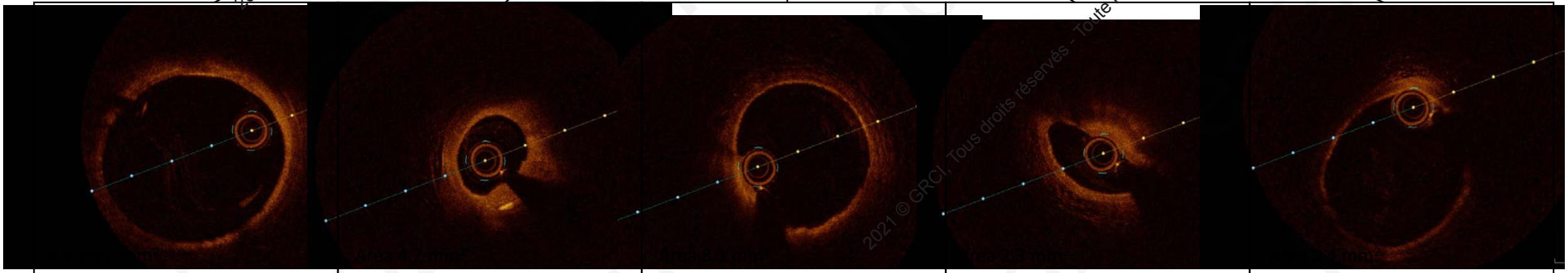
FFR pullback pre PCI





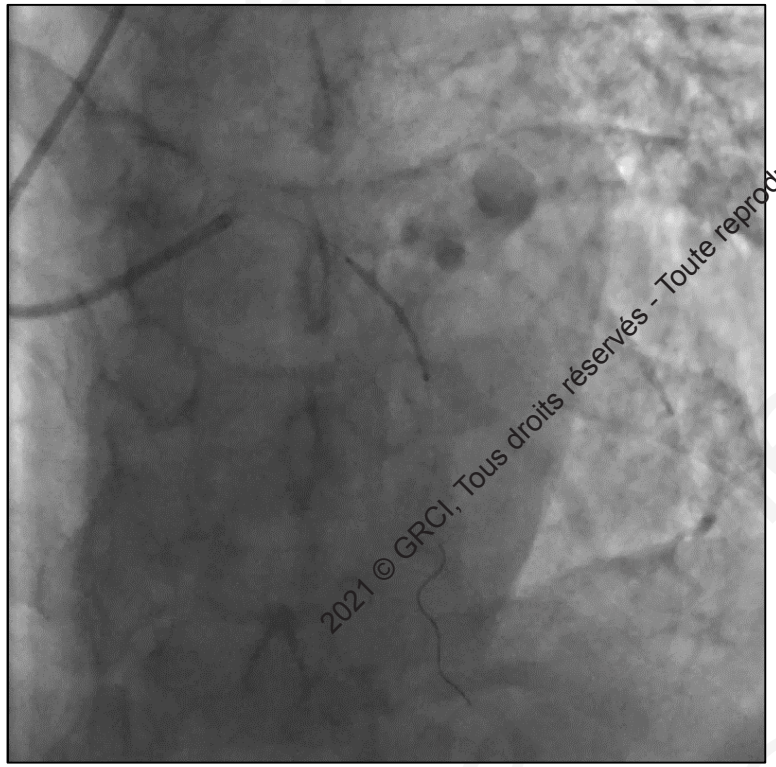
* Drift correction algorithm applied

OCT pre PCI



Diameter 3.4 mm	Diameter 2.3 mm	Diameter 3.2 mm	Diameter 1.6 mm	Diameter 3.5 mm

PCI

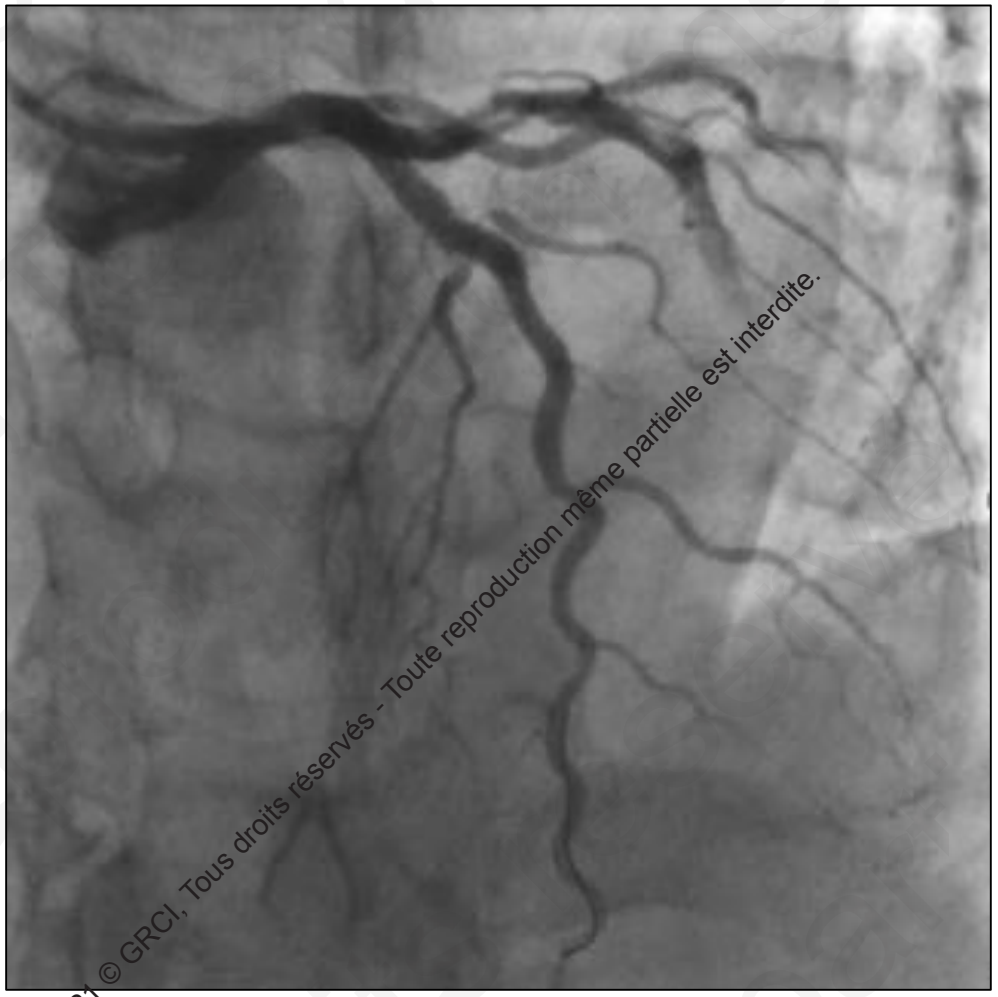


Stent Position

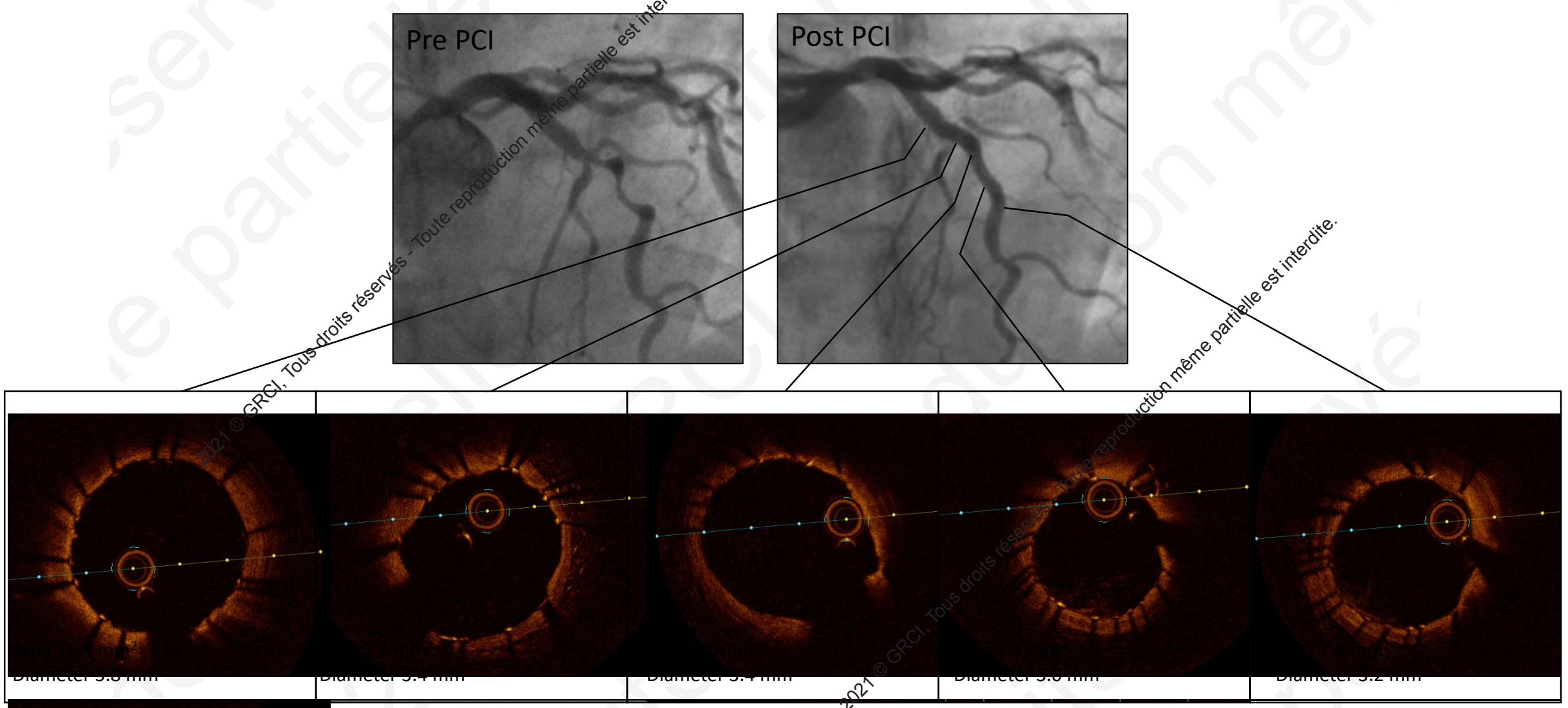
Xience 3.5 x 33mm

Post PCI

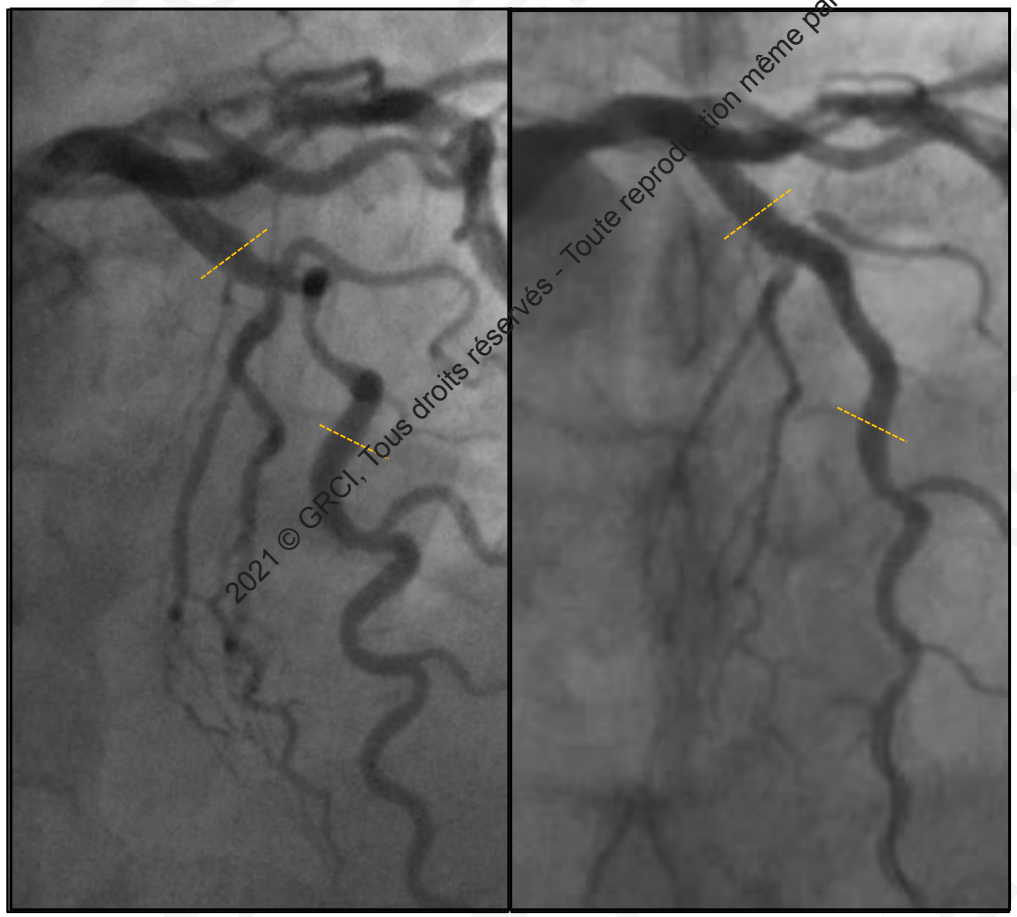
Post PCI angiography



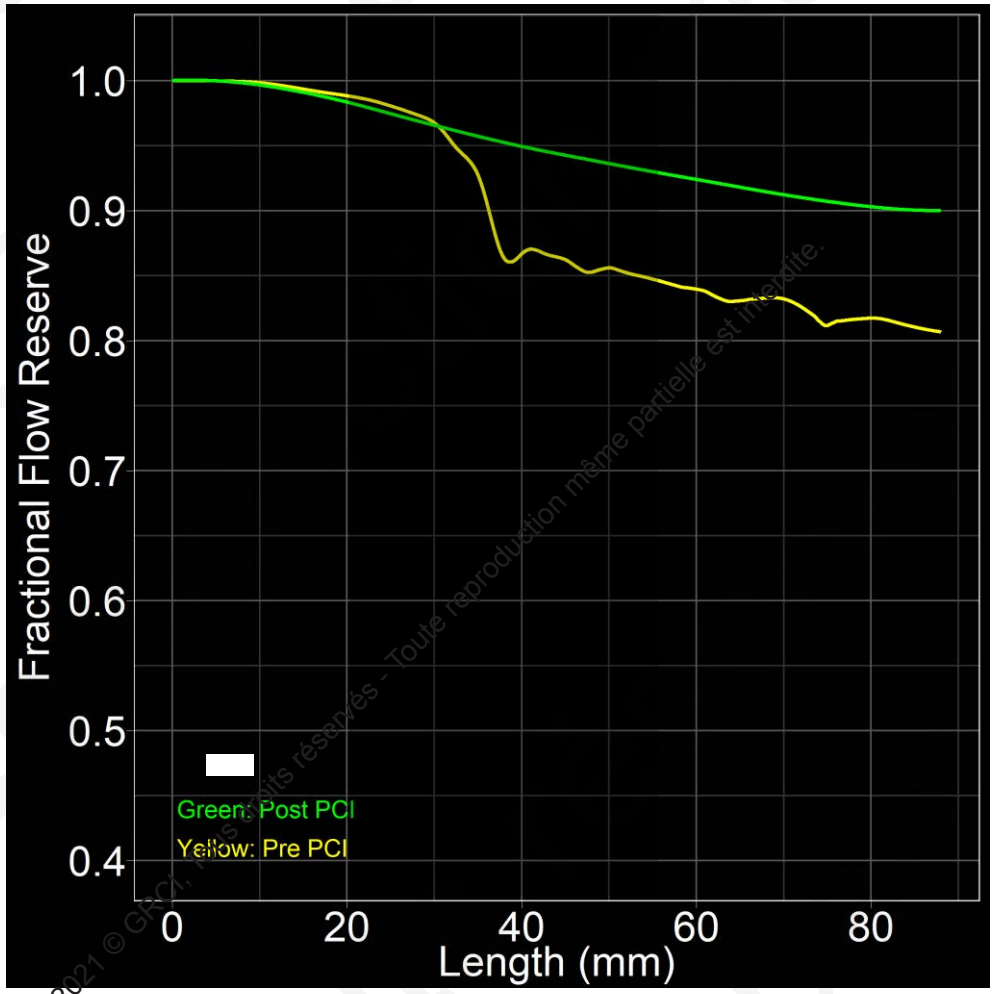
Post PCI OCT



Comparison between invasive FFR pullback pre and post PCI



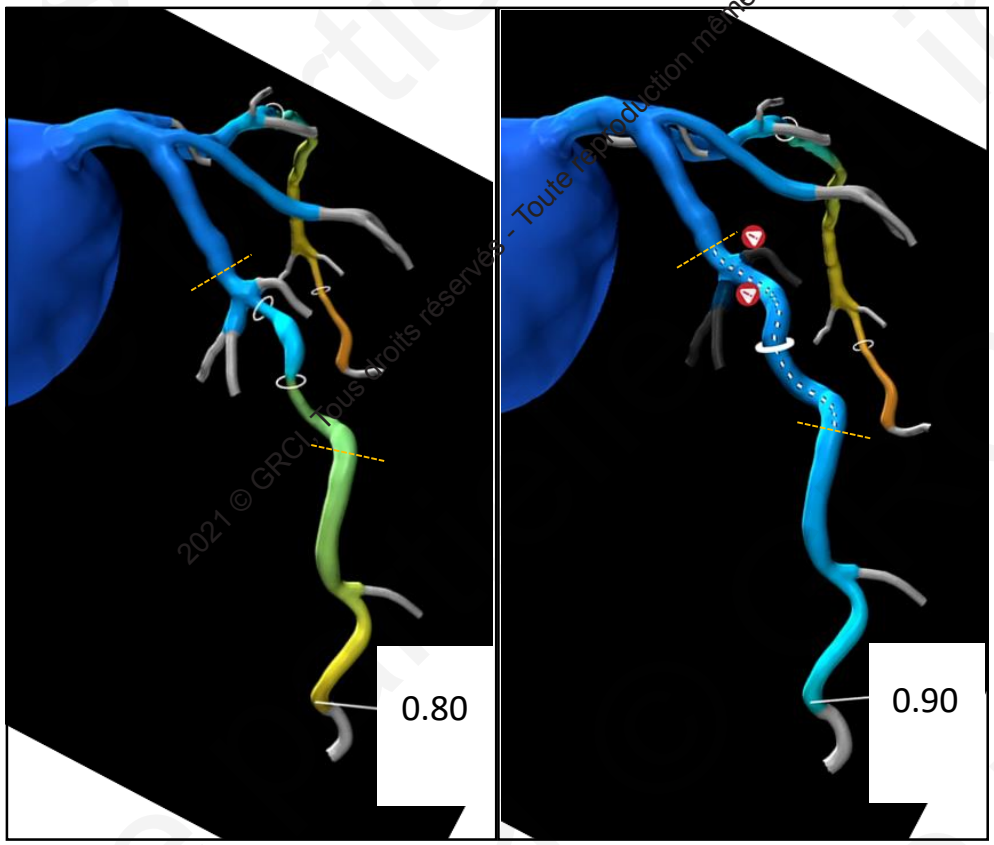
Dash line: edge of stent



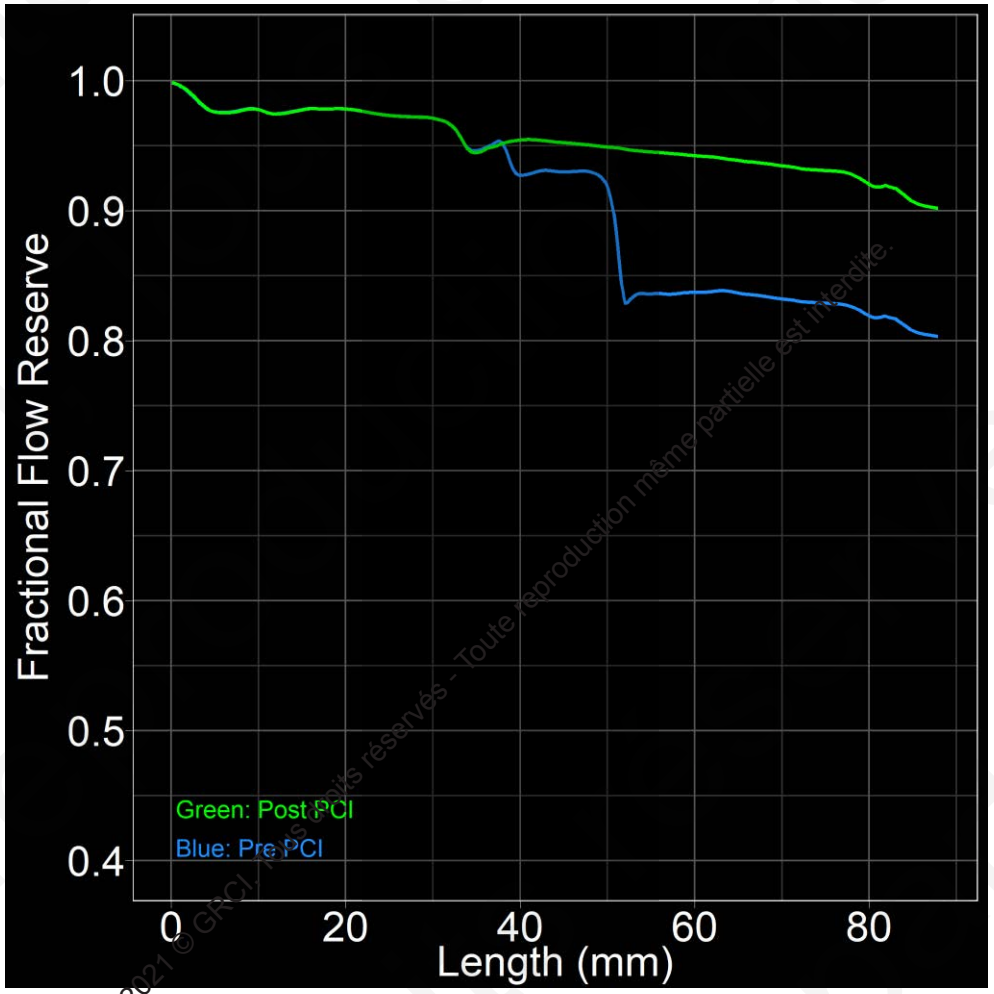
Shaded area: stent position

Comparison between FFR_{CT} pullback pre and post PCI (HeartFlow Planner)

Pre PCI **Post PCI (Planner)**



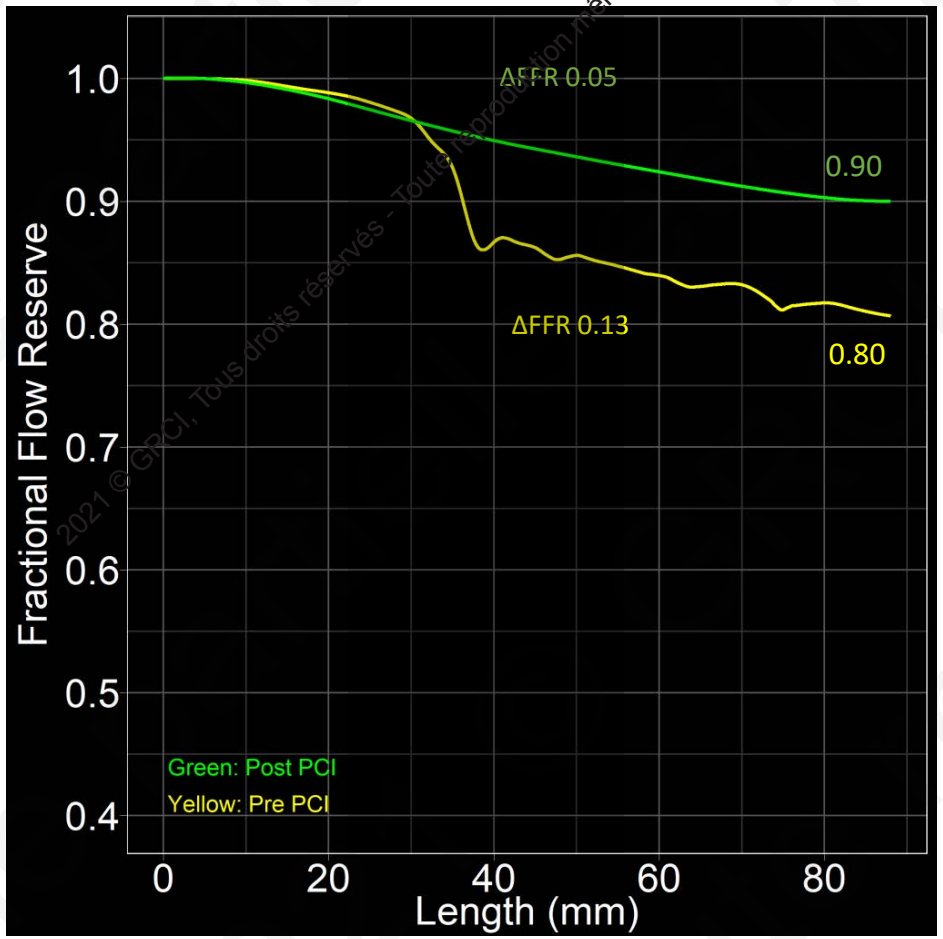
Dash line: edge of stent



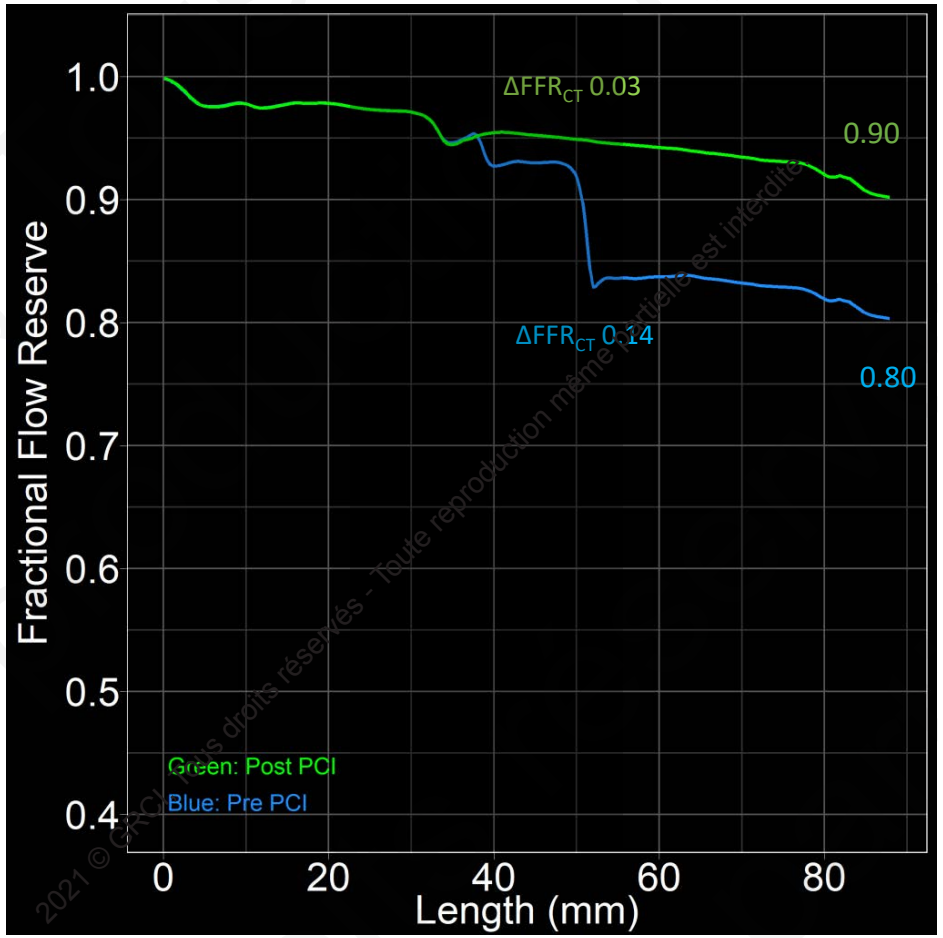
Shaded area: stent position

Comparison between FFR_{CT} pullback and invasive FFR pullback pre and post PCI

Invasive FFR pullback



FFR_{CT} pullback



Take home messages :

Un CT (+ FFR-CT) peut permettre :

1) De détecter une maladie coronarienne
2) De définir si CABG ou PCI
3) En cas de PCI, de planifier le geste

CHUV
Lausanne
Suisse