

# PLACE



PLATFORM OF LABORATORIES FOR ADVANCES IN CARDIAC EXPERIENCE

**ROMA**

Centro Congressi  
di Confindustria

**Auditorium  
della Tecnica**

**9<sup>a</sup> Edizione**

**30 Settembre**

**1 Ottobre**

**2022**



## **Coronary Physiology & Intravascular Imaging**

## **LEFT MAIN**

## **FUNCTIONAL GUIDED PCI**

## **Fabio Mangiacapra**



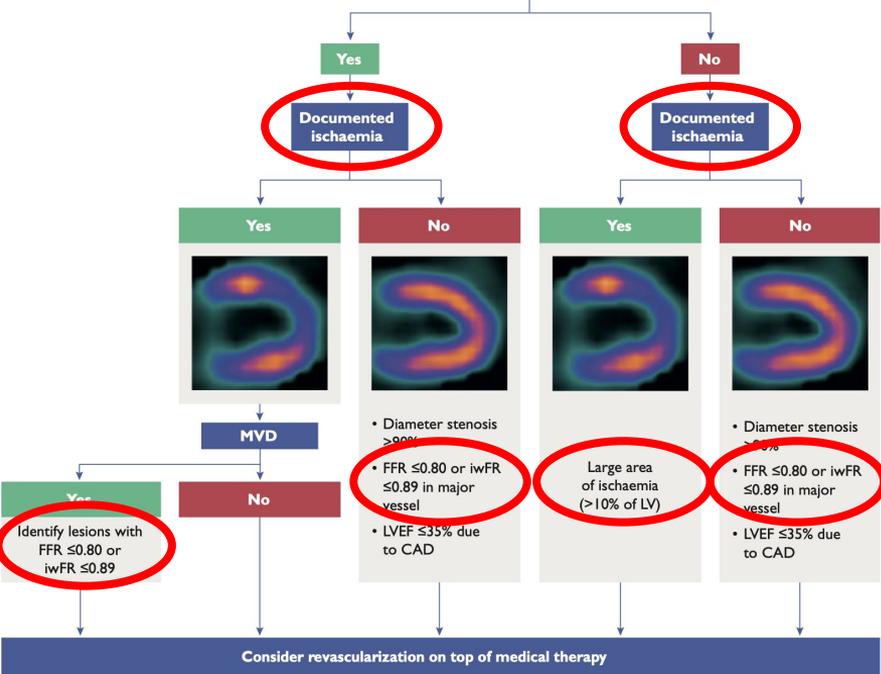
# LM PCI - physiologic vs anatomic guidance

## 3 key steps

- Indication to revascularization
- Procedure planning
- Result assessment



Knuuti et al. EHJ 2019



Indications for revascularization in patients with stable angina or silent ischaemia

Extent of CAD (anatomical and/or functional)		Class <sup>a</sup>	Level <sup>b</sup>
For prognosis	Left main disease with stenosis $>50\%$ . <sup>c 68-71</sup>	I	A
	Proximal LAD stenosis $>50\%$ . <sup>c 62,68,70,72</sup>	I	A
	Two- or three-vessel disease with stenosis $>50\%$ with impaired LV function (LVEF $\leq 35\%$ ). <sup>c 61,62,68,70,73-83</sup>	I	A
	Large area of ischaemia detected by functional testing ( $>10\%$ LV) or abnormal invasive FFR. <sup>d 24,59,84-90</sup>	I	B
	Single remaining patent coronary artery with stenosis $>50\%$ . <sup>c</sup>	I	C
For symptoms	Haemodynamically significant coronary stenosis <sup>e</sup> in the presence of limiting angina or angina equivalent, with insufficient response to optimized medical therapy. <sup>e 24,63,91-97</sup>	I	A

CAD = coronary artery disease; FFR = fractional flow reserve; iwFR = instantaneous wave-free ratio; LAD = left anterior descending coronary artery; LV = left ventricular; LVEF = left ventricular ejection fraction.

<sup>a</sup>Class of recommendation.

<sup>b</sup>Level of evidence.

<sup>c</sup>With documented ischaemia or a haemodynamically relevant lesion defined by FFR  $\leq 0.80$  or iwFR  $\leq 0.89$  (see section 3.2.1.1), or  $>90\%$  stenosis in a major coronary vessel.

<sup>d</sup>Based on FFR  $<0.75$  indicating a prognostically relevant lesion (see section 3.2.1.1).

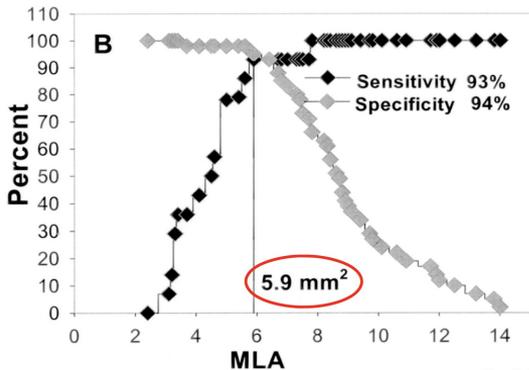
<sup>e</sup>In consideration of patient compliance and wishes in relation to the intensity of anti-anginal therapy.

Neumann et al. EHJ 2018

© ESC 2018



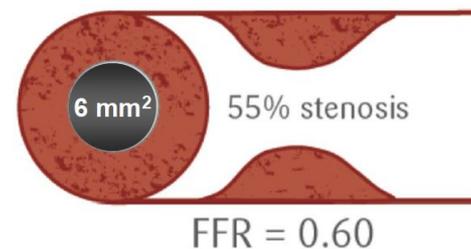
# Anatomic surrogates of ischaemia?



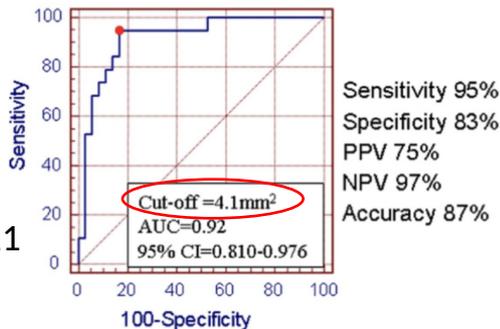
Jasti et al. Circulation 2004



6 MM<sup>2</sup> TOO SMALL?



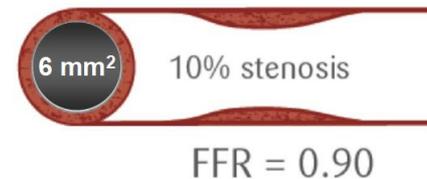
**C. MLA predicting FFR<0.75**



Kang et al. JACC Intv 2011



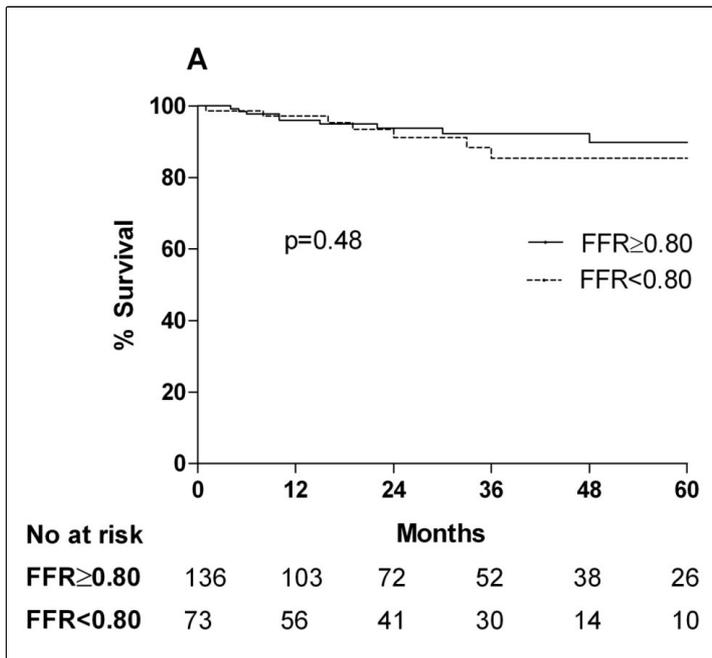
6 MM<sup>2</sup> SUFFICIENT?



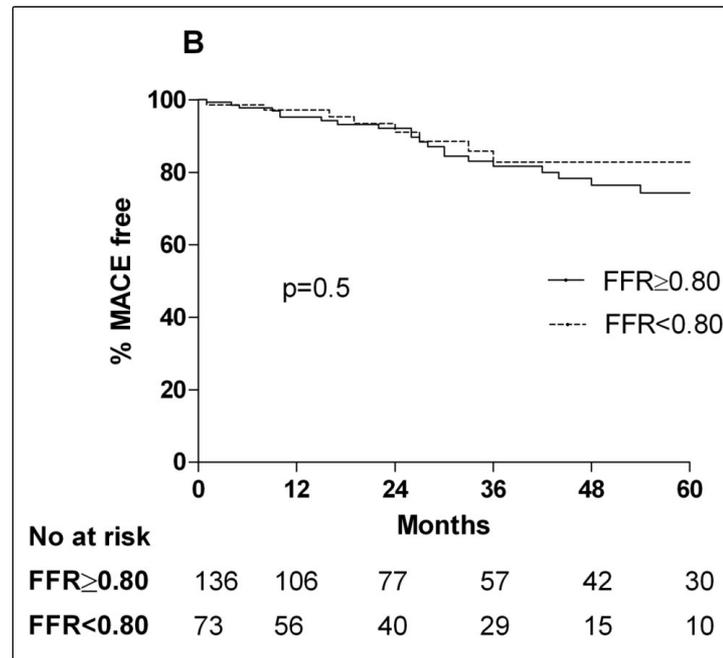


# Ischaemia-guided LM revascularization

## Overall survival



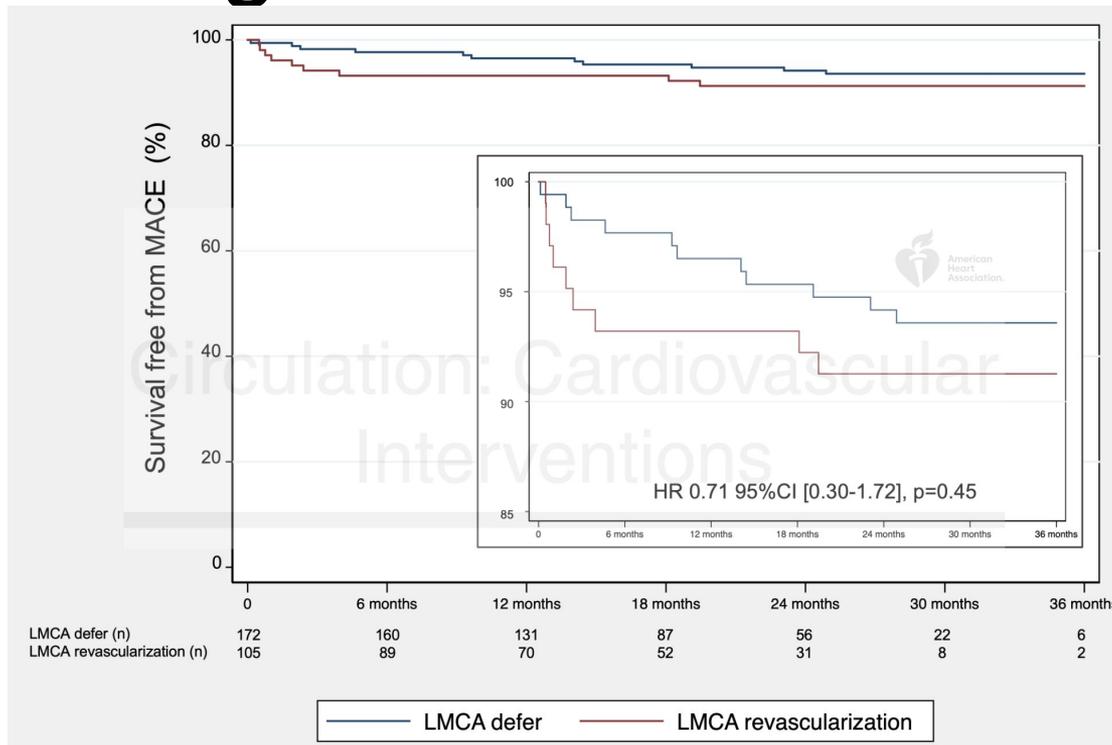
## MACE free-survival



Hamilos et al. Circulation 2009



# Ischaemia-guided LM revascularization

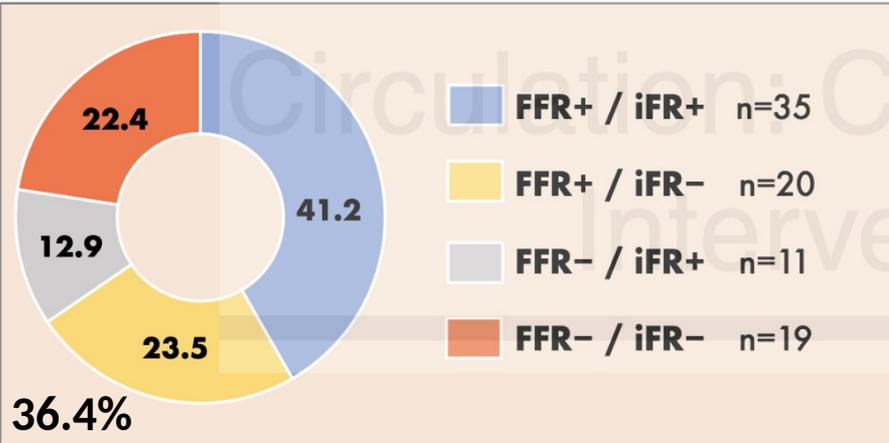




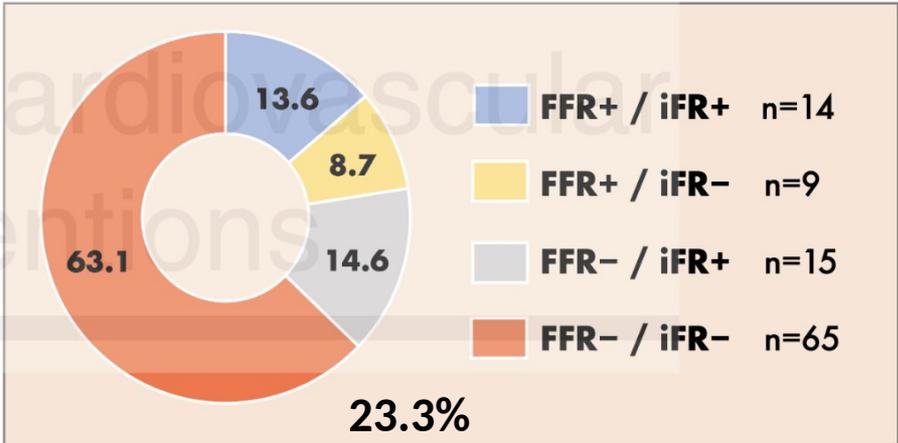
# FFR vs iFR in LM assessment

## Intermediate LMCA stenosis with IVUS evaluation N=188

**IVUS MLA < 6 mm<sup>2</sup>**  
 N=85 (45.2)



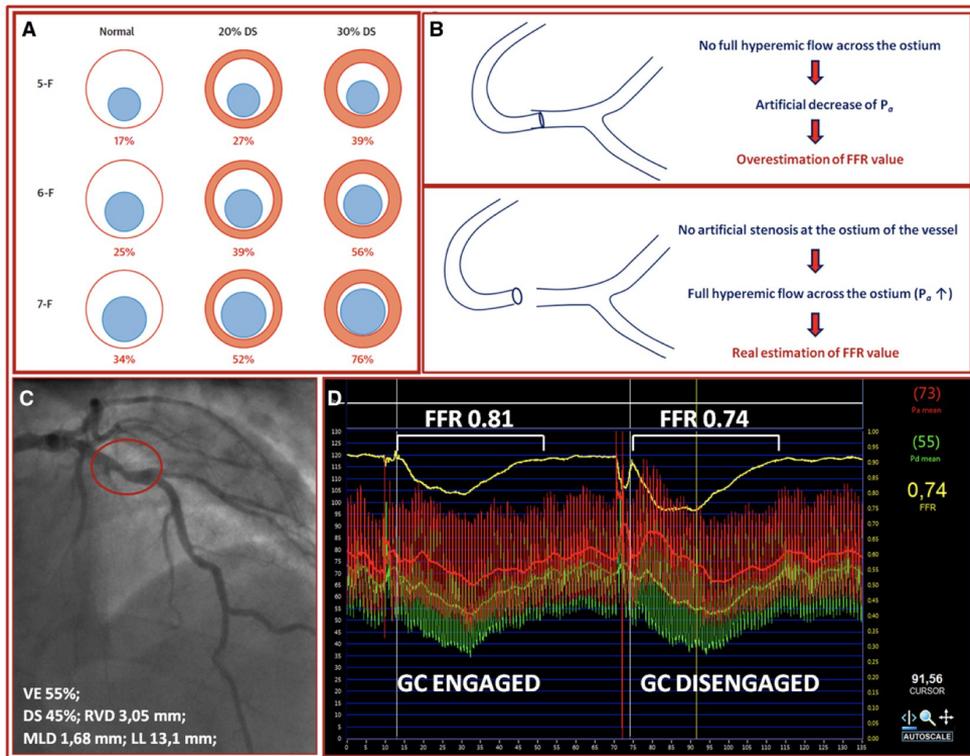
**IVUS MLA ≥ 6 mm<sup>2</sup>**  
 N=103 (54.8)



**Overall FFR-iFR discordance in 29.3% of patients**



# DISENGAGE Registry

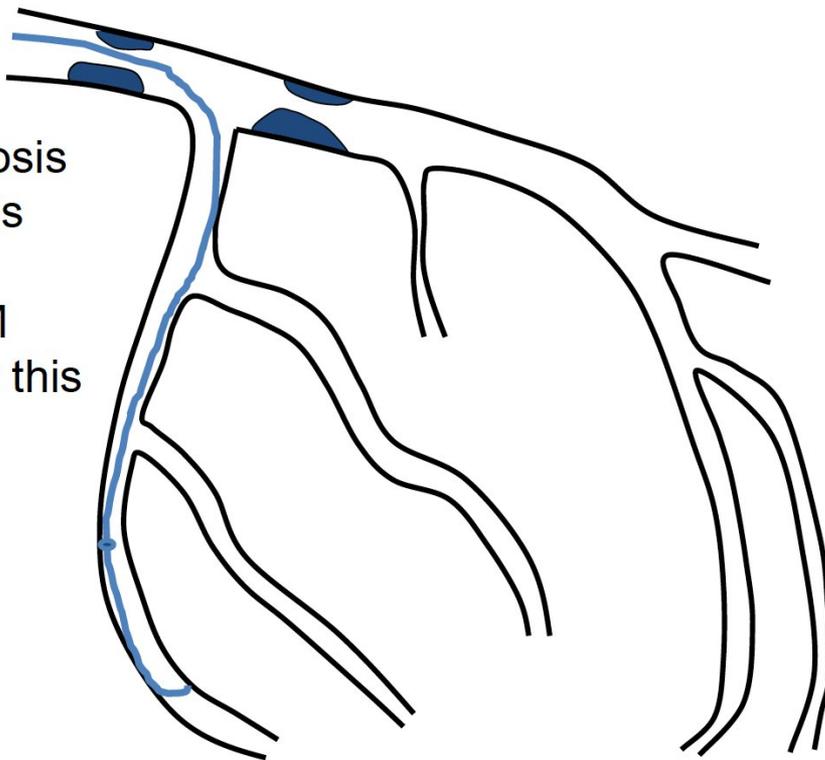




# Impact of Downstream Stenosis

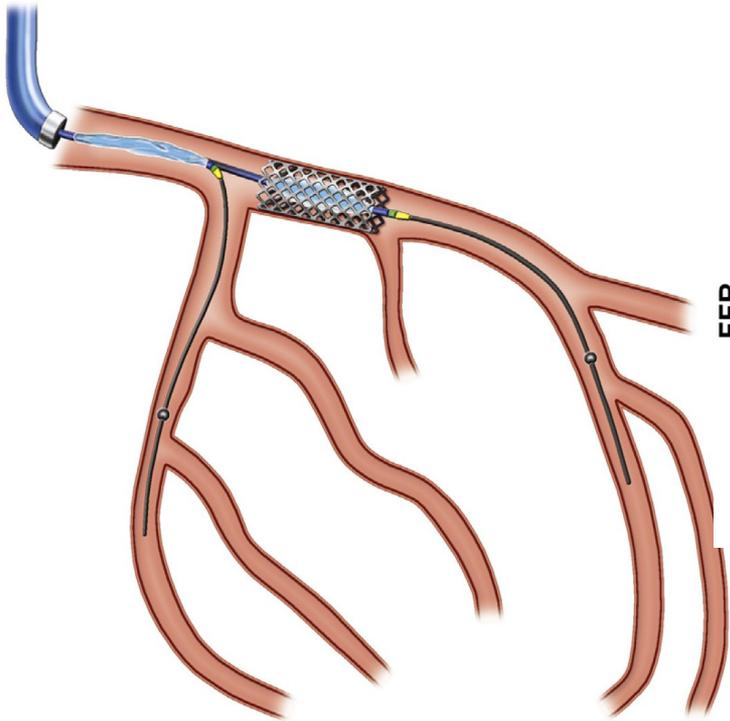
The influence of a distal stenosis on the FFR of the LM depends on the extent to which hyperemic flow across the LM stenosis will be decreased by this distal lesion

- Severity
- Myocardial mass

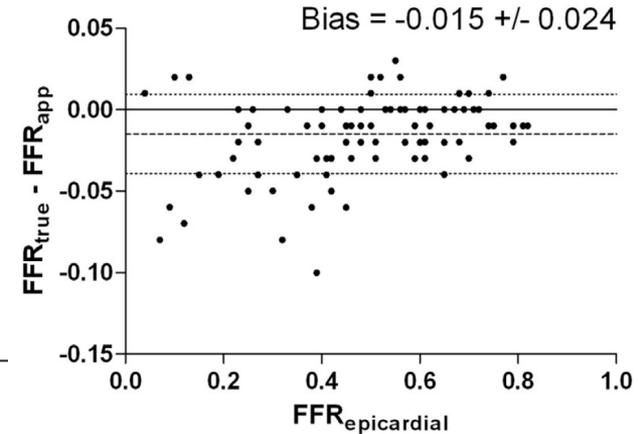
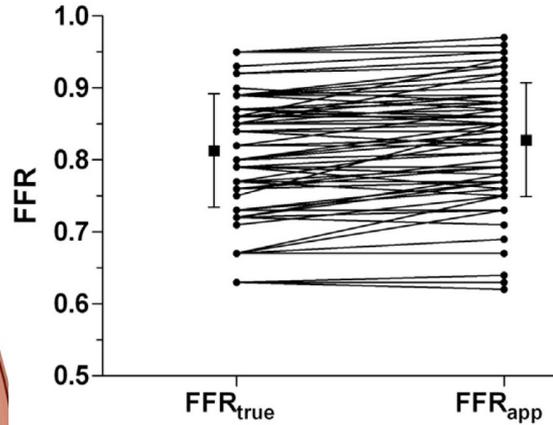




# Impact of Downstream Stenosis



$0.81 \pm 0.08$  vs.  $0.83 \pm 0.08$ ,  $P < 0.001$  (n=91)



When  $FFR_{app} > 0.85$ ,  $FFR_{true} > 0.80$   
in 100% of cases



# LM PCI - physiologic vs anatomic guidance

## 3 key steps

- Indication to revascularization
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# Procedure planning

## Physiology

- Involvement of side branch

## Imaging

- Vessel size
- Lesion length
- Ostium involvement
- Plaque characteristics
- ...



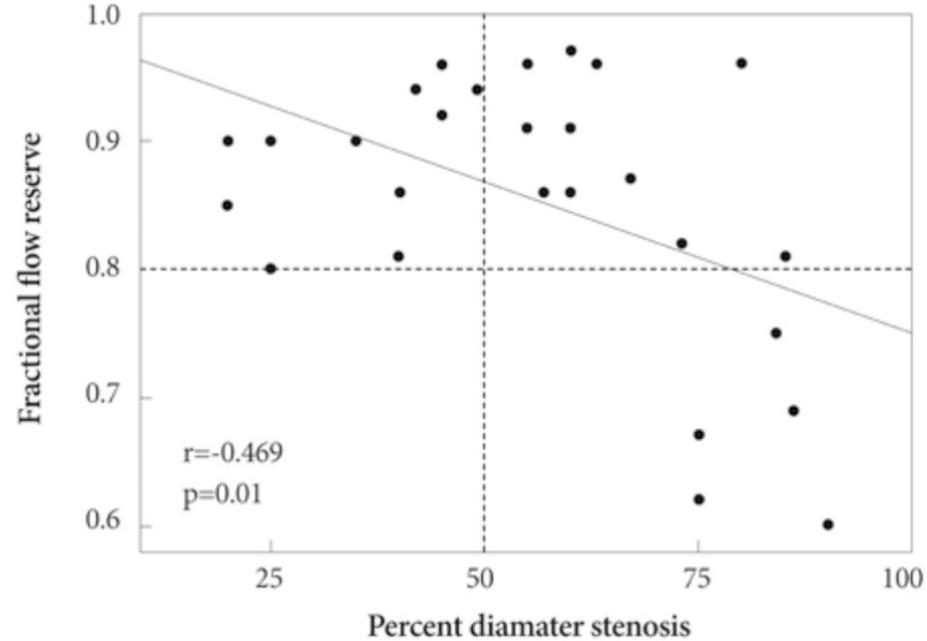
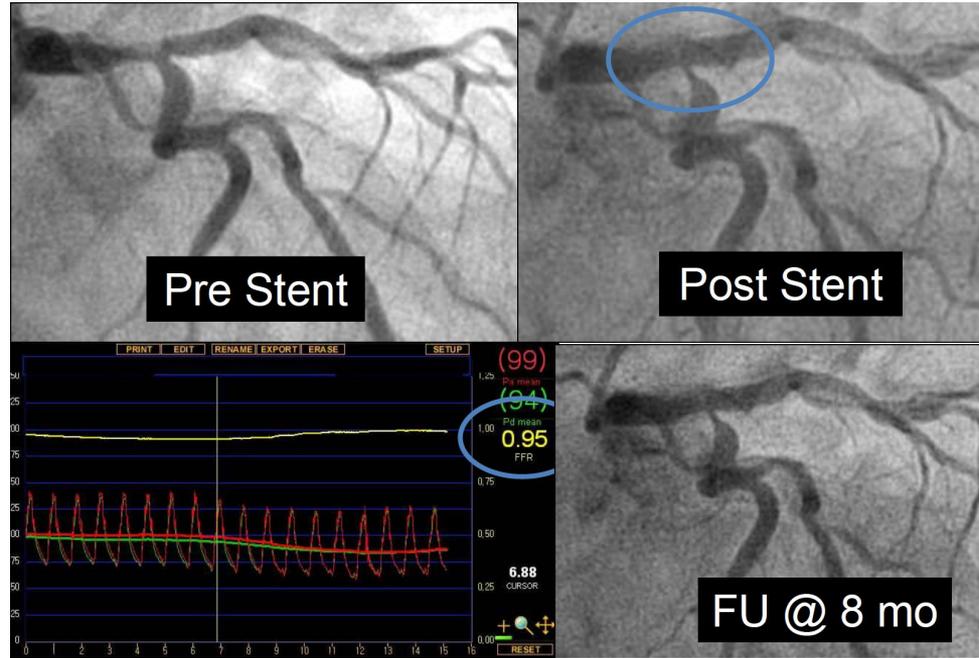
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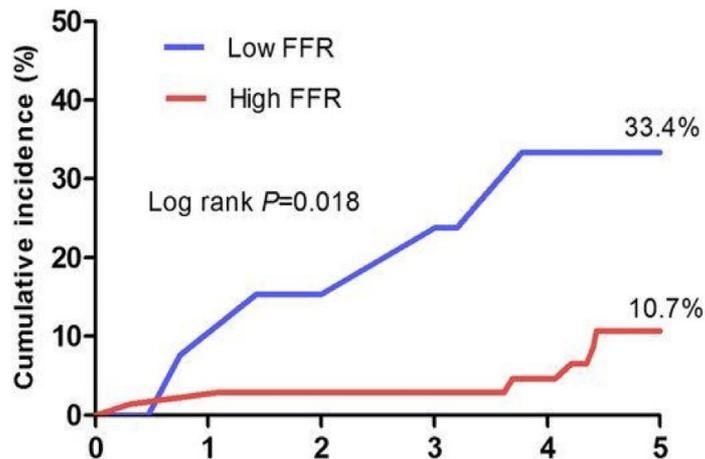
# Jailed Left Circumflex





# Jailed Left Circumflex

Target-lesion failure



	No. of patients at risk					
	Years after PCI					
	0	1	2	3	4	5
Low FFR	14	13	12	11	8	4
High FFR	69	69	66	60	51	37



# LM PCI - physiologic vs anatomic guidance

## 3 key steps

- Indication to revascularization **Physiology**
- Procedure planning **Imaging +/- Physiology**
- Result assessment **Imaging +/- Physiology**



**Coronary physiology + IC imaging**



**Optimal strategy for the right lesion**



***“You know what the issue is with this world?  
Everyone wants a magical solution to their problem,  
and everyone refuses to believe in magic”***

Alice in Wonderland

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# Key points

## Coronary physiology to:

- Target only ischemia-inducing lesions
- Avoid futile interventions
- Choose most appropriate strategies
- Optimize resources
- Simplify procedures



**Coronary physiology + IC imaging**



**Optimal strategy for the right lesion**