Challenges in leftmain PCI

A\Prof. Trương Quang Bình MD, PhD, FSCAI
University of Medicine and Pharmacy at HCMC

"The Fear Factor"

The two words "LEFT MAIN" are enough to strike fear into the hearts of most physicians

Why do we fear LM disease?

- High mortality with medical treatment
- High mortality after surgical treatment
- High mortality with acute MI and cardiogenic shock associated with LMCAD
- High mortality with PCI

LMCA Disease: Elective PCI with DES

In-hospital:		
Mortality:	1%	
MI:	<4%	
Follow-up:	6 – 24 months	
Mortality:	8%	(0-21)
TLR:	12%	(0-44)
MACE:	22%	(2-54)

Challenges in Leftmain PCI

- Firstly, the leftmain is a big vessel which supplies an awful lot of myocardium
- Secondly, it's very common for there to be calcification of the vessel.
- Thirdly, it is bifurcation if not a trifurcation.
- Fourthly, the hemodynamic consequences of the loss of a big side branch: LAD or circumflex.

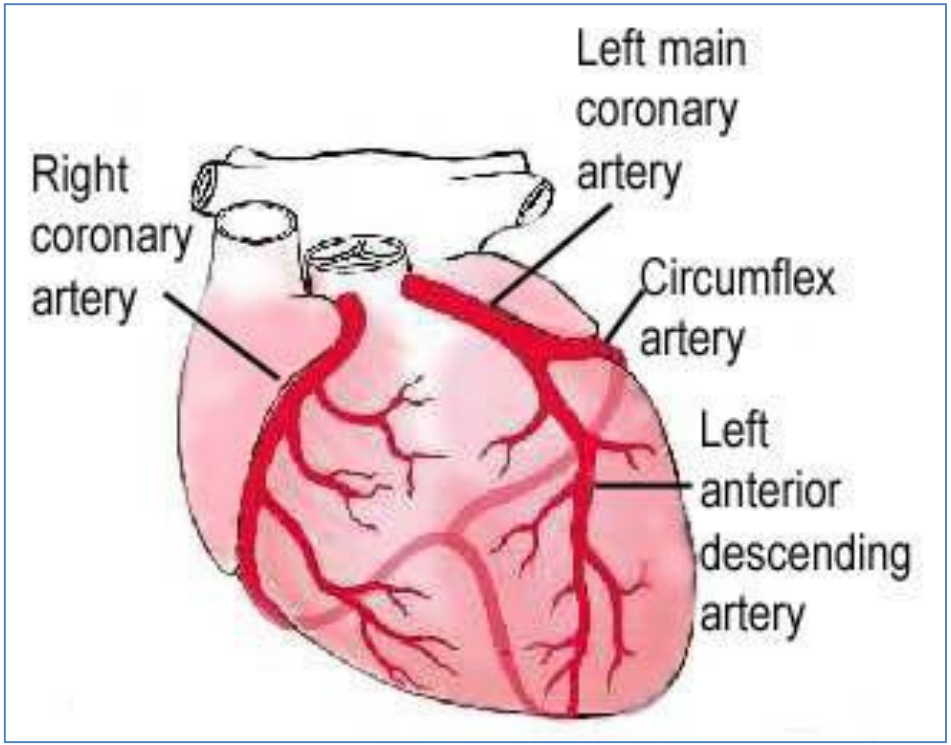
=> all of those things combine to make leftmain intervention a challenge

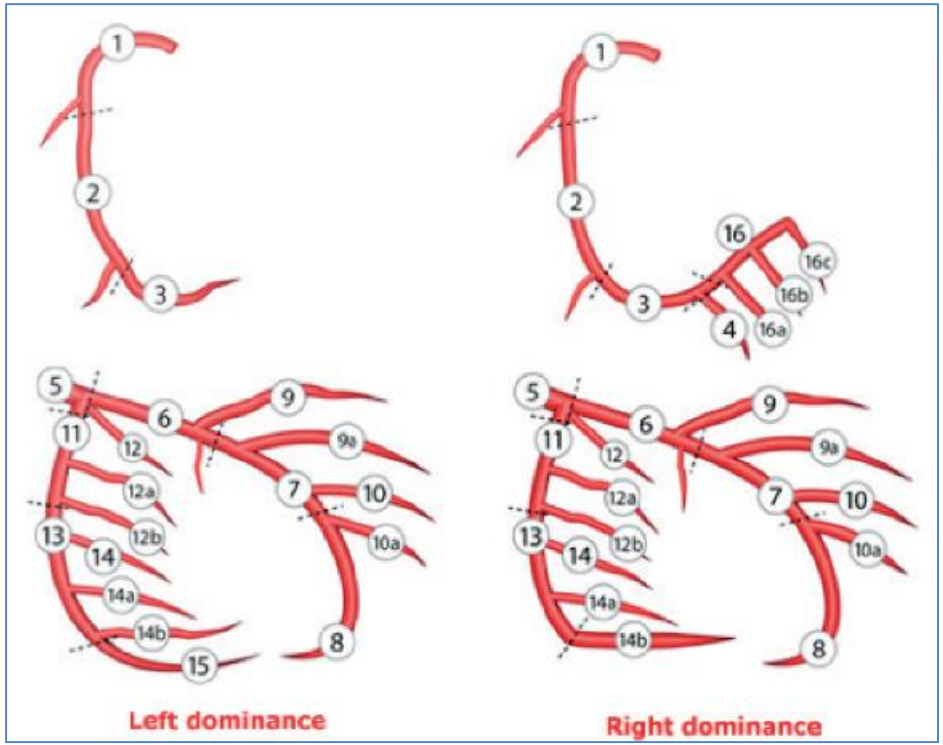
Challenges in Leftmain PCI

- Firstly, the leftmain is a big vessel which supplies an awful lot of myocardium
- Secondly, it is bifurcation if not a trifurcation.
- Thirdly, it's very common for there to be calcification of the vessel.
- Fourthly, the hemodynamic consequences of the loss of a big side branch: LAD or circumflex.

=> all of those things combine to make leftmain intervention a challenge

Left main coronary artery





The myocardium supplied by the LM generally accounts for considerably **more than 50% of the total myocardial mass**

High mortality in LM occlusion

Table 1 – Baseline clinical characteristics of patients with AMI caused by the LMCA occlusion or critical stenosis.

	AMI with LMCA as the infarct related artery	AMI with other infarct related arteries	*P* value
N =	97	6645	
Mean age (years; SD)	68,9 (11.2)	65,7 (12.0)	0.009
Females	30%	32%	0.742
Diabetes	31%	28%	0.569
Previous MI	23%	21%	0.706
Killip class on admission (mean; SD)	2,25 (1.29)	1,42 (0.83)	<0.001
Bundle branch block on the admission ECG (LBBB or RBBB)	27%	10%	<0.001
Ejection fraction (mean; SD)	38,1% (12.4)	48,9% (13.4)	<0.001
In-hospital mortality	25,8%	5,2%	<0.001

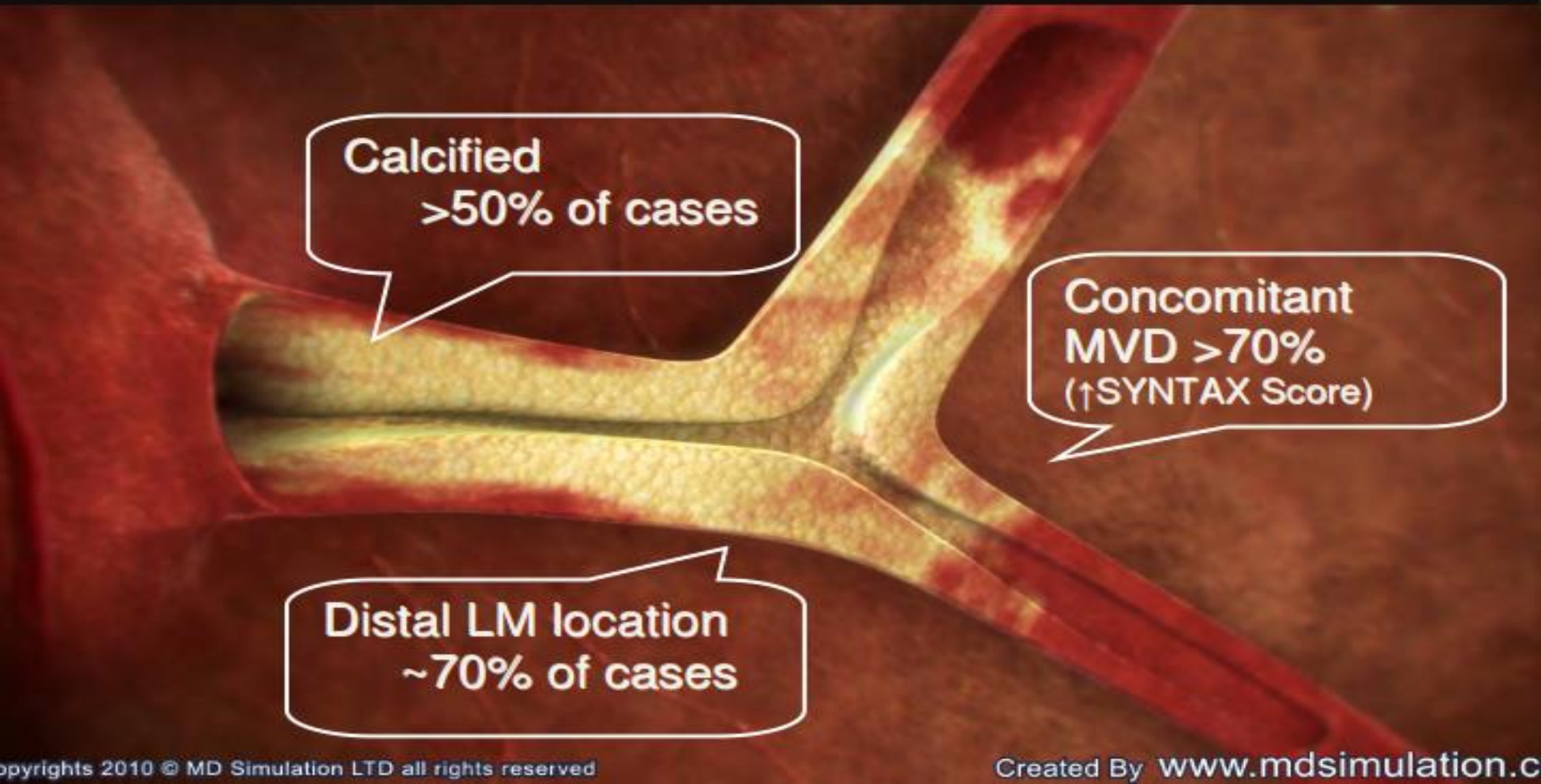
COR ET VASA54 (2012) e3–e7

Challenges in Leftmain PCI

- Firstly, the leftmain is a big vessel which supplies an awful lot of myocardium
- Secondly, it's very common for there to be calcification of the vessel.
- Thirdly, it is bifurcation if not a trifurcation.
- Fourthly, the hemodynamic consequences of the loss of a big side branch: LAD or circumflex.

=> all of those things combine to make leftmain intervention a challenge

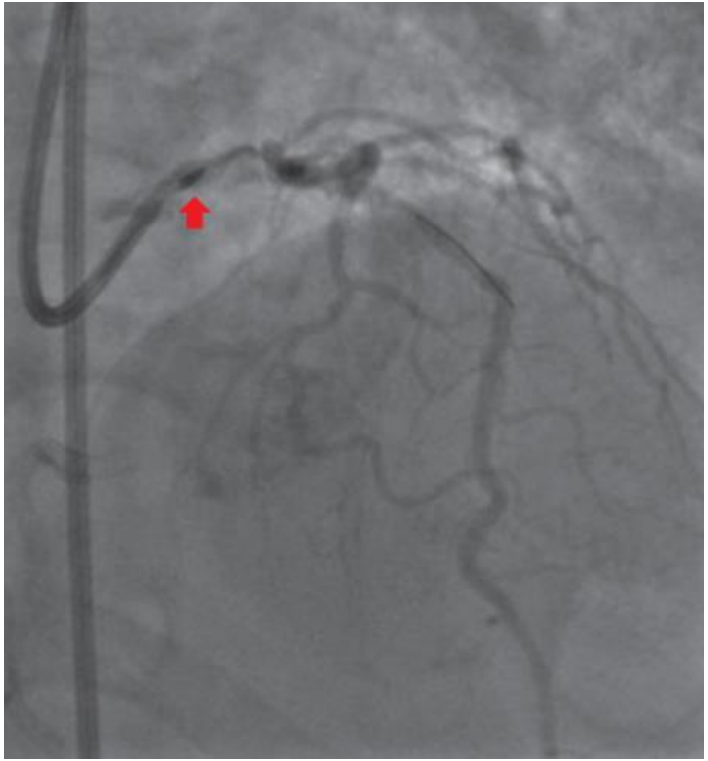
Left main complexities



Created By www.mdsimulation.c

How can we have a successful PCI for LM lesions with heavy calcification ?

- **Heavily calcified lesions are:**
- difficult to dilate adequately,
- associated with failure to deliver a stent,
- impaired drug delivery,
- possible polymer disruption with drug-eluting stents (DES),
- stent underexpansion.



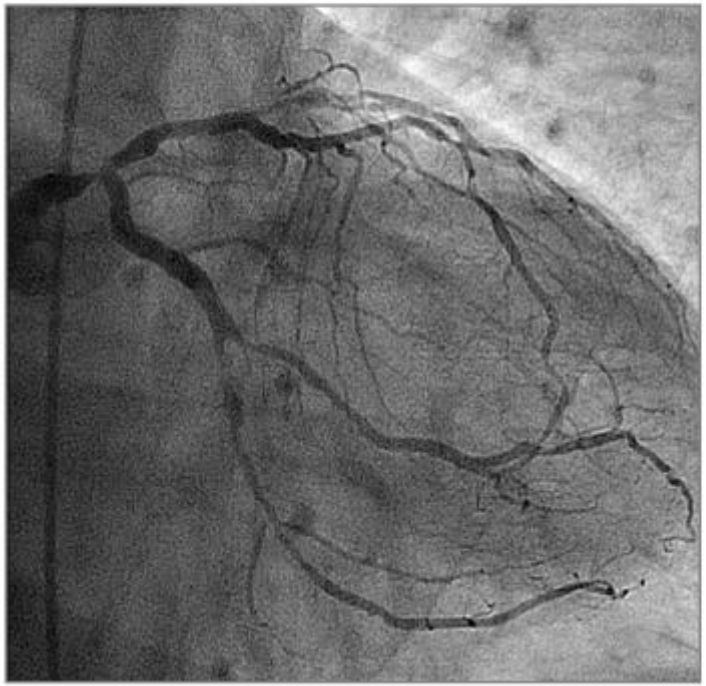
Challenges in Leftmain PCI

- Firstly, the leftmain is a big vessel which supplies an awful lot of myocardium
- Secondly, it's very common for there to be calcification of the vessel.
- Thirdly, it is bifurcation if not a trifurcation.
- Fourthly, the hemodynamic consequences of the loss of a big side branch: LAD or circumflex.

=> all of those things combine to make leftmain intervention a challenge

euro PCR

LMCA Disease

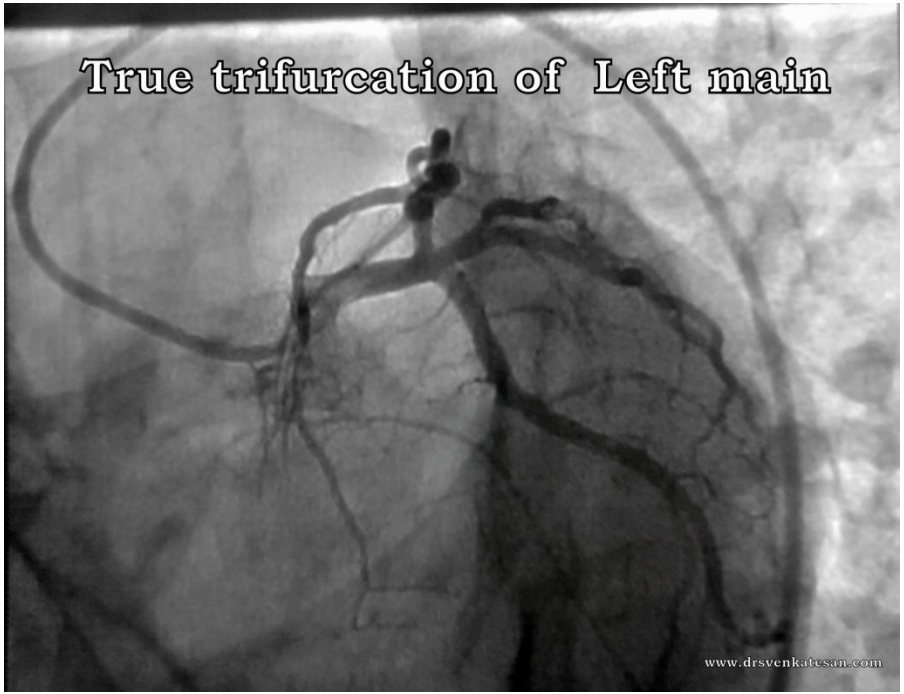


Distal location
>70% of cases

Calcified
>50% of cases

MVD
>70% of cases

Bifurcation, trifurcation of leftmain



Trifurcations are encountered in about 10% of cases

LMCA Disease: Elective PCI with DES

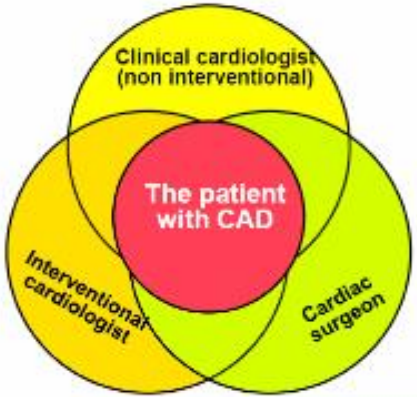
In-hospital:		
Mortality:	1%	
MI:	<4%	
Follow-up:	6 – 24 months	
Mortality:	8%	(0-21)
TLR:	12%	(0-44)
MACE:	22%	(2-54)

How to overcome challenges in leftmain PCI?

1.

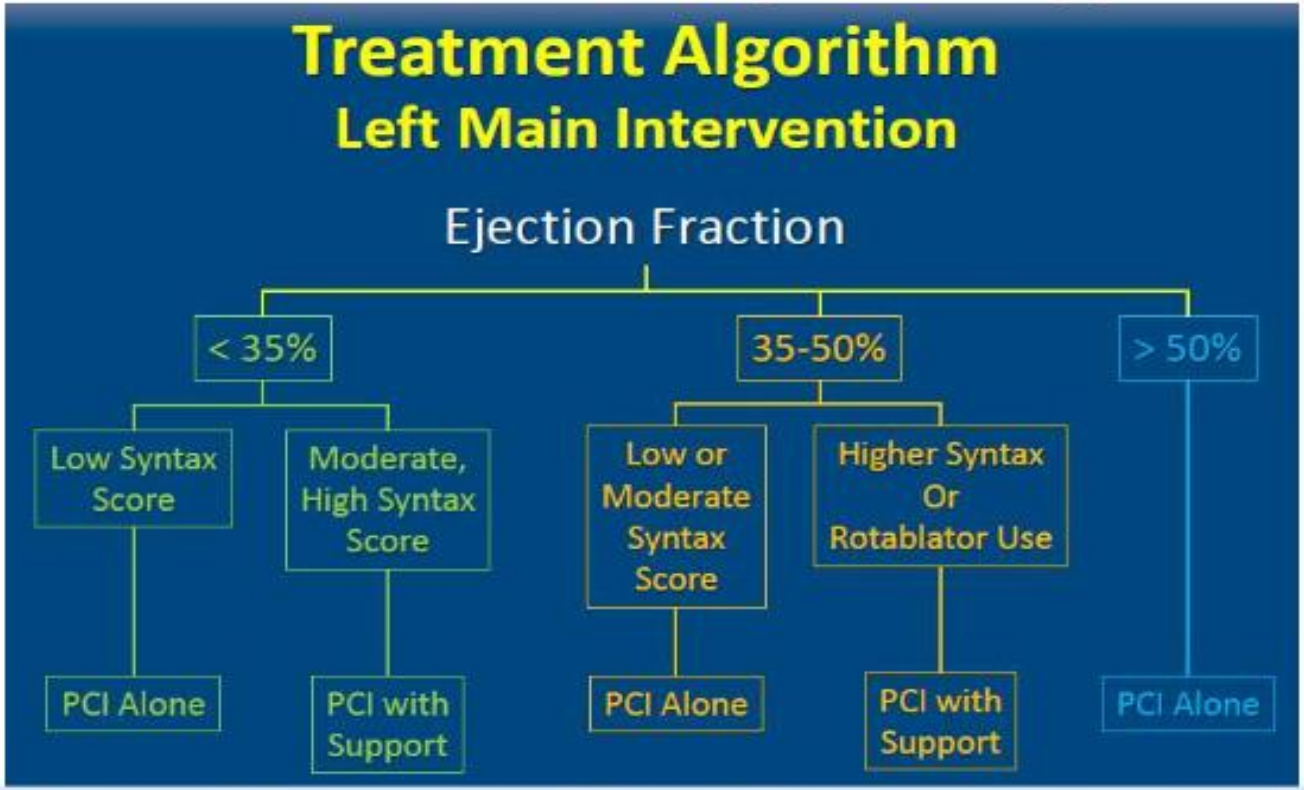
The meaning of HEART TEAM

The Heart Team

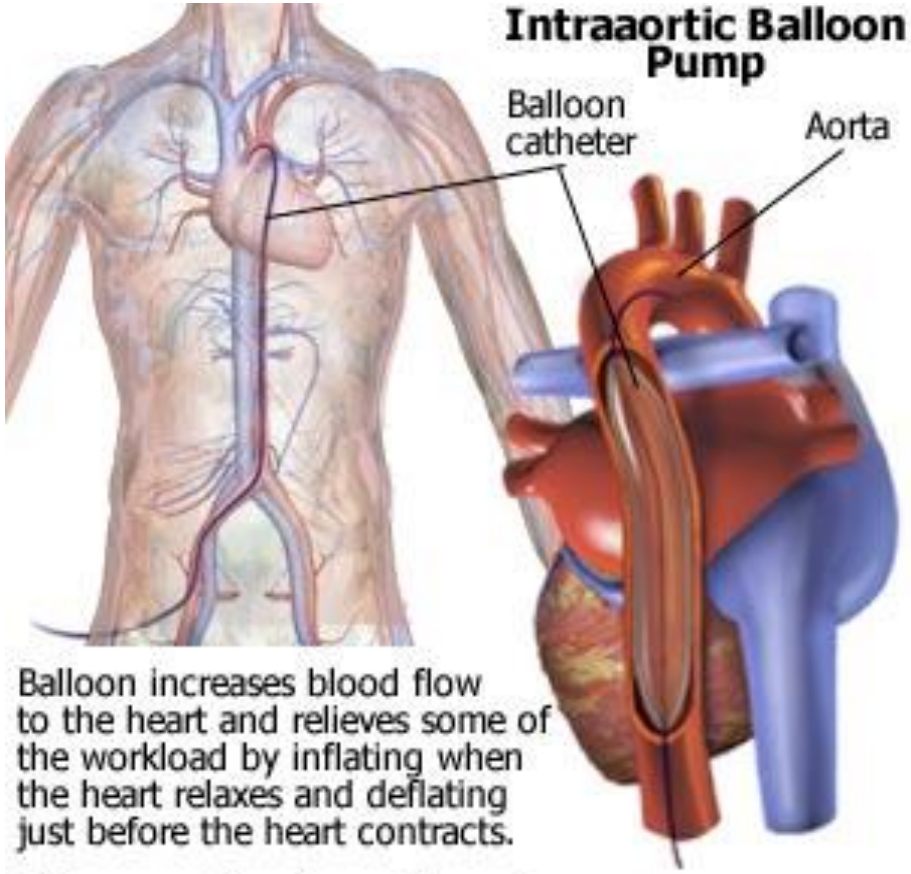


2.

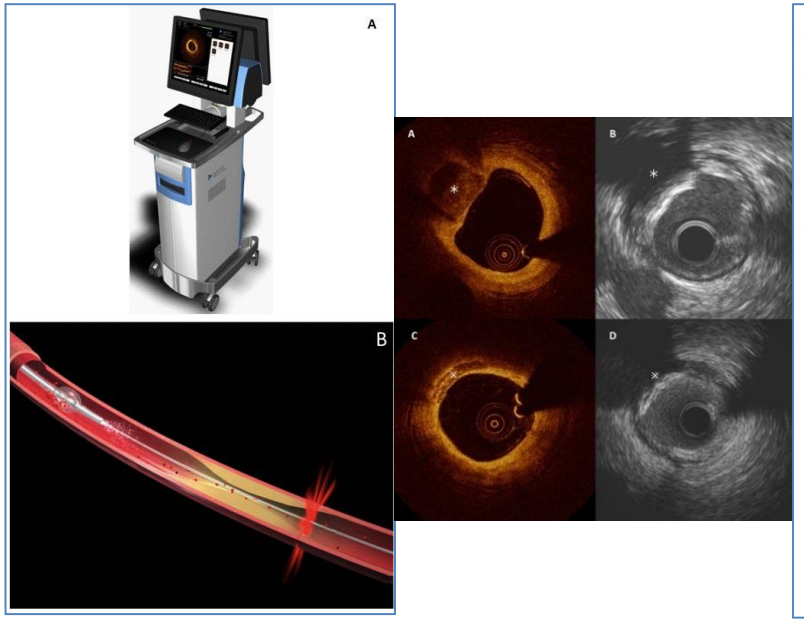
When Would I Use Upfront Support?

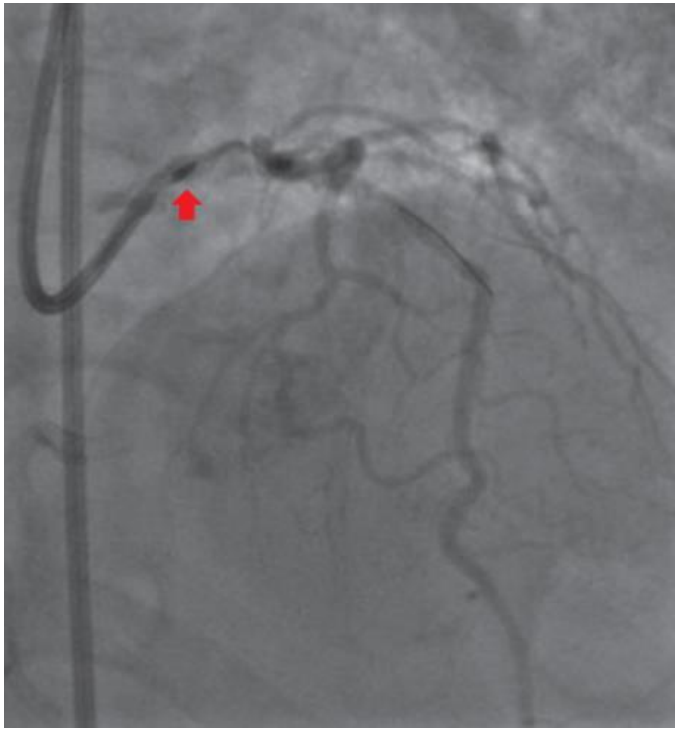


Most LM PCI can be performed safely without Support (but available!)


Intraaortic Balloon Pump
Balloon catheter
Aorta
Balloon increases blood flow to the heart and relieves some of the workload by inflating when the heart relaxes and deflating just before the heart contracts.
This perspective shows the aorta as it extends down behind the heart.

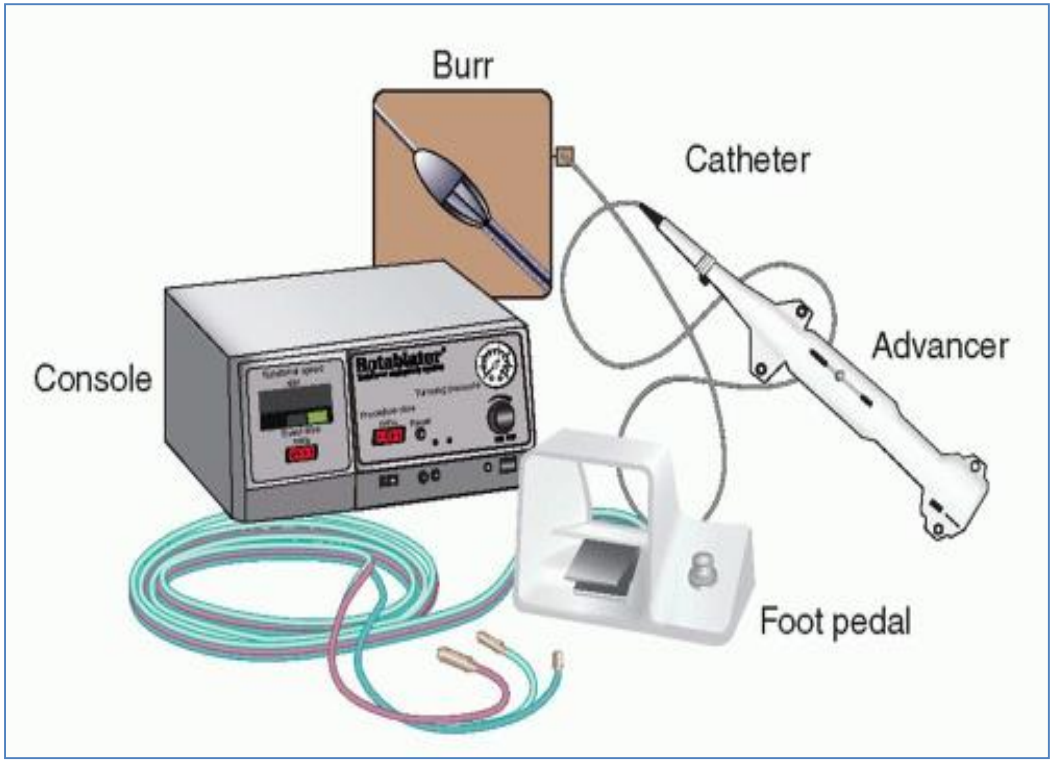
3. Devices

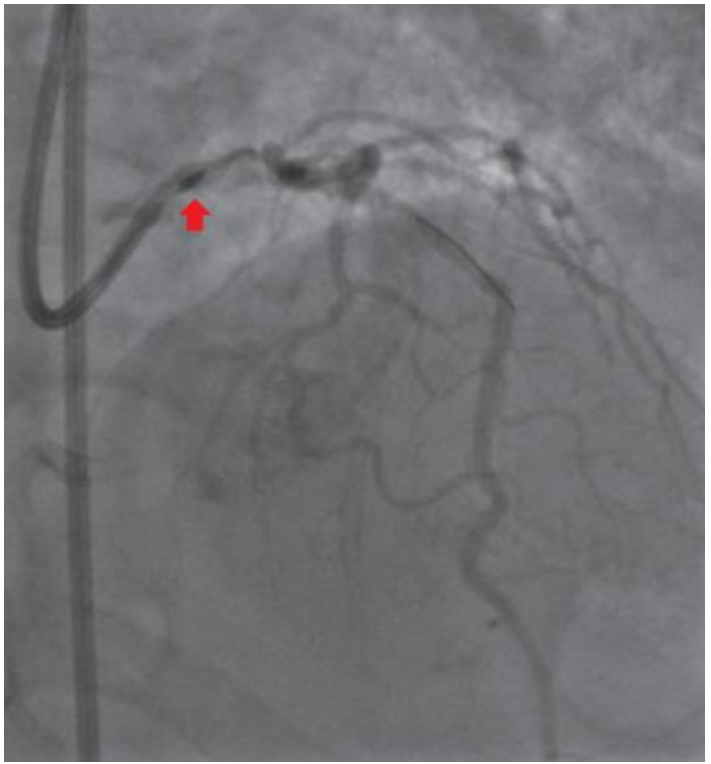




Size of vessels ? Length of lesions ?
Calcification ?
Optimize the stenting (expansion, apposition)

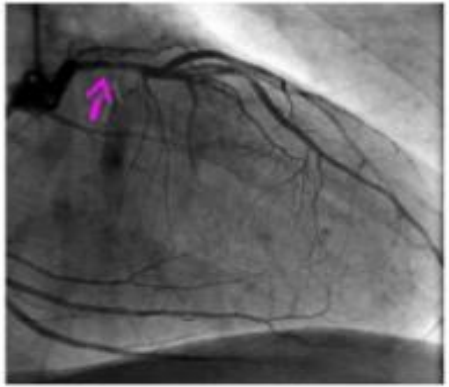
3. Devices



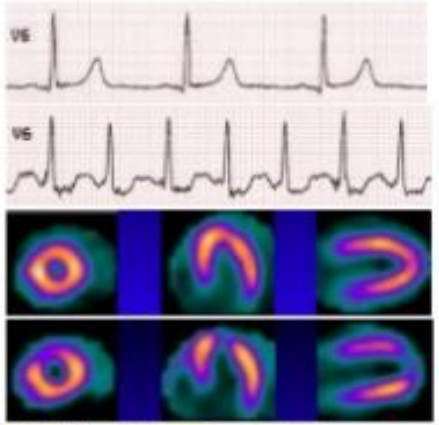


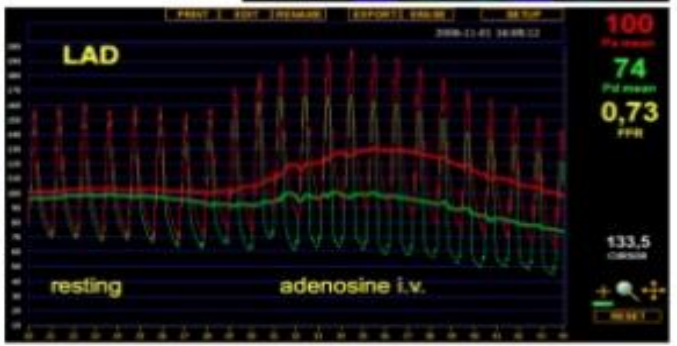
3. Devices

Clinical importance of FFR



59 year-old man with
mild & long LAD lesion
and no rest symptoms
but classic angina



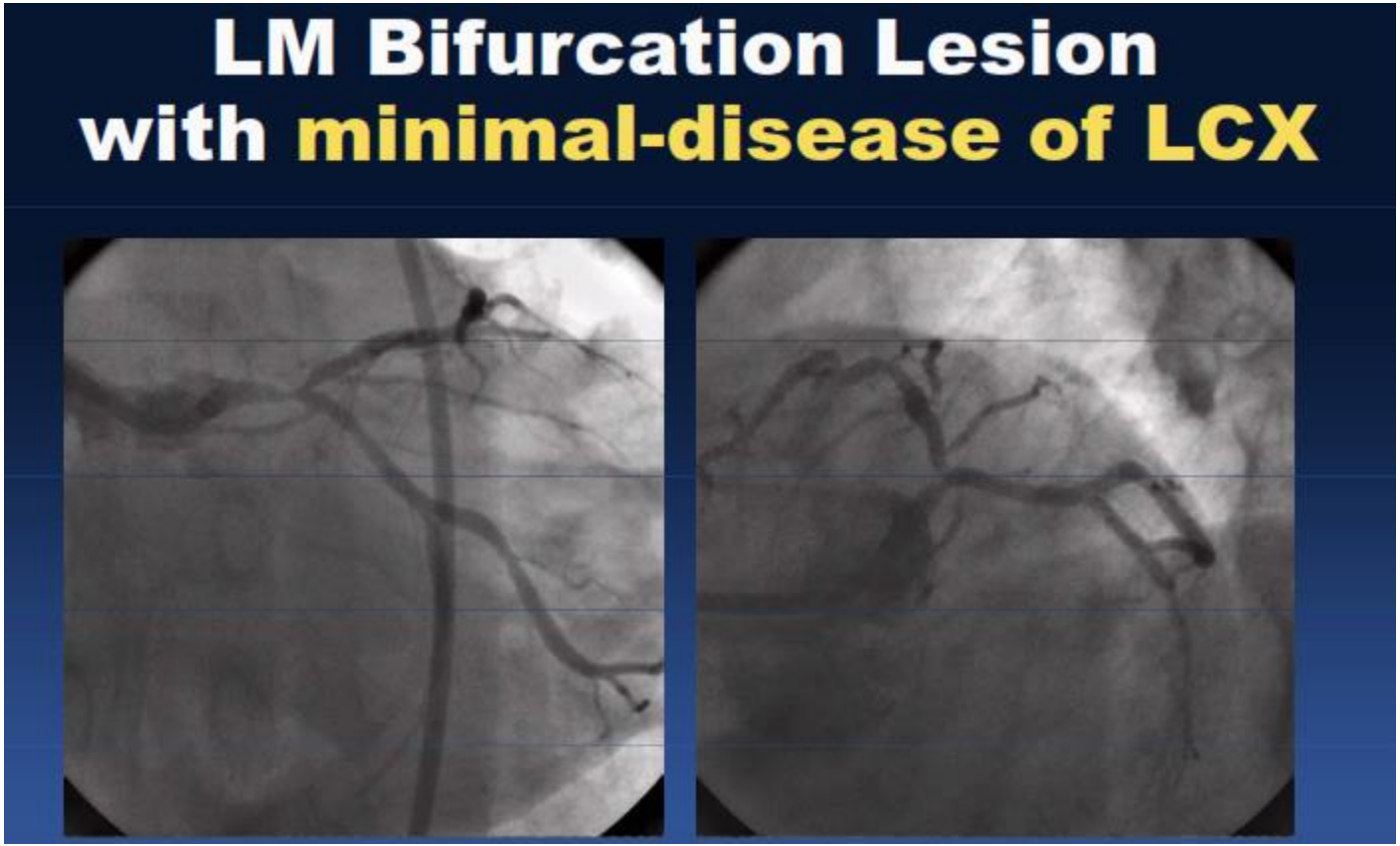


Pd/Pa = 0.96
iFR = 0.97

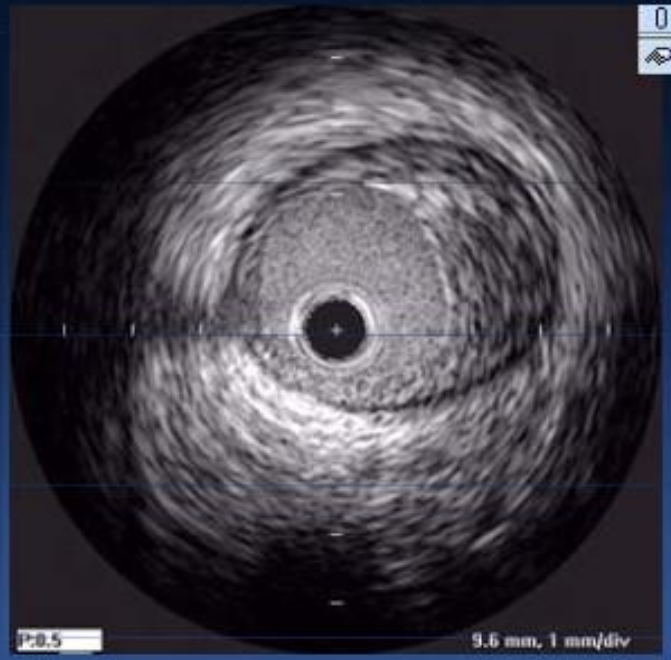
FFR = 0.73

Composite of slides presented by Pijls NH, TCT lecture on September 14, 2014

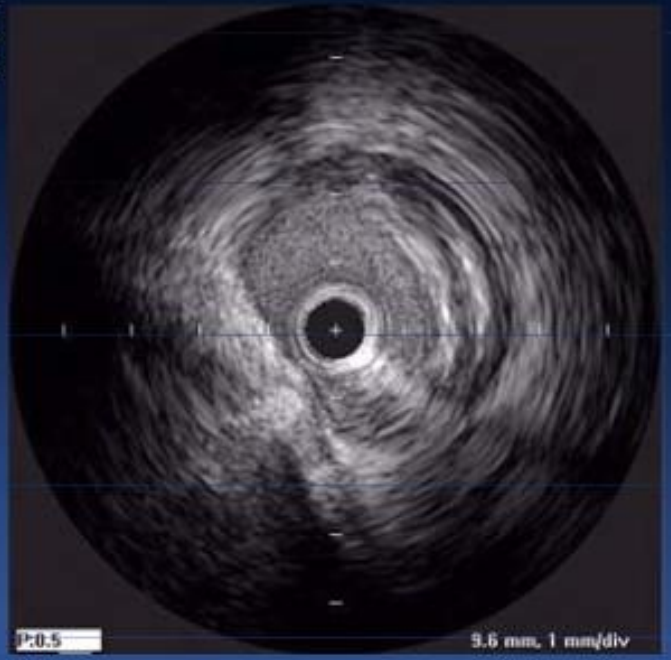
3. Devices



IVUS



LAD Ostium



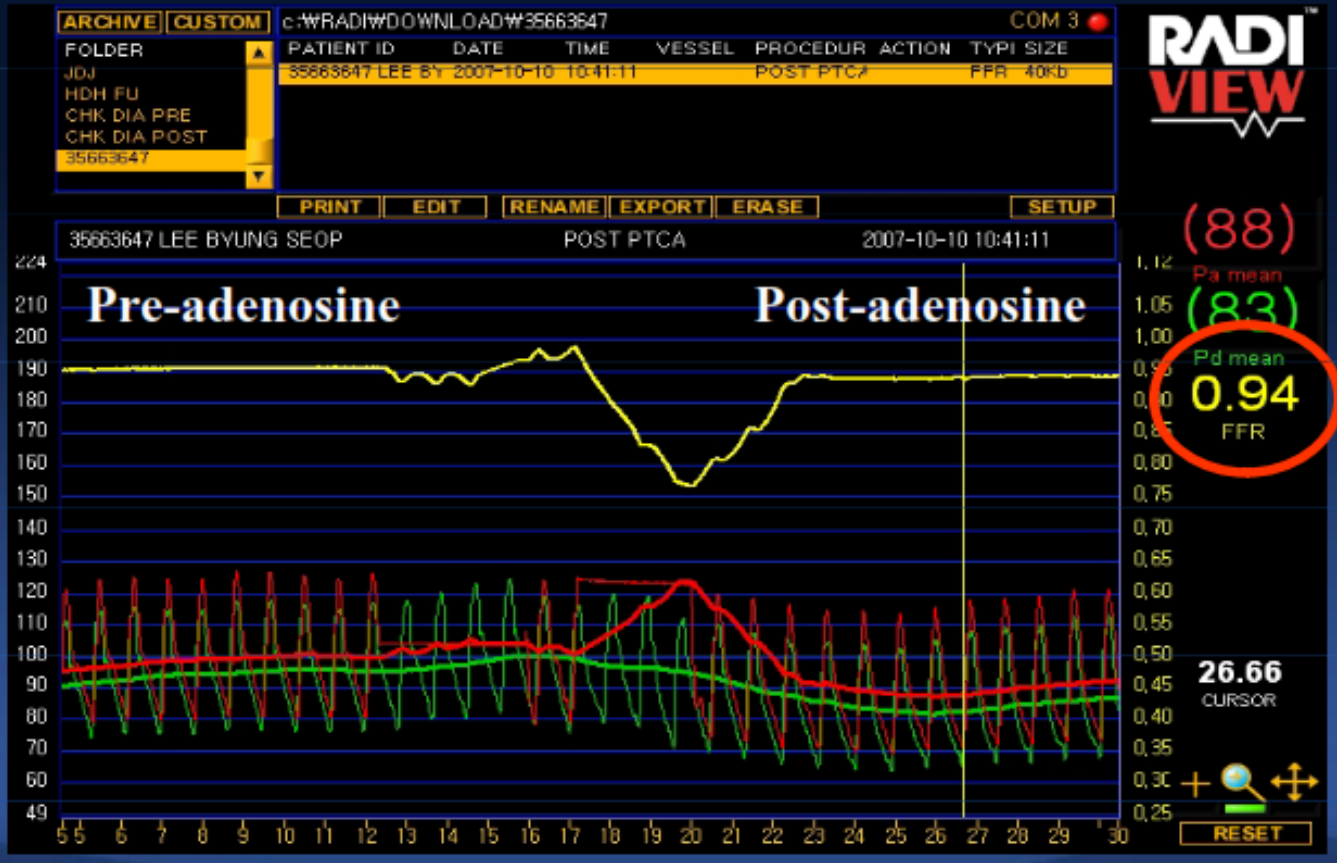
LCX Ostium
Minimal-disease
MLA 5.4 mm^2

Single Stent Cross-Over
with minimal-disease at LCX OS

Final Results
after Single Stent Cross-Over

Immediate after the procedure, there was no significant compromise of LCX ostium.

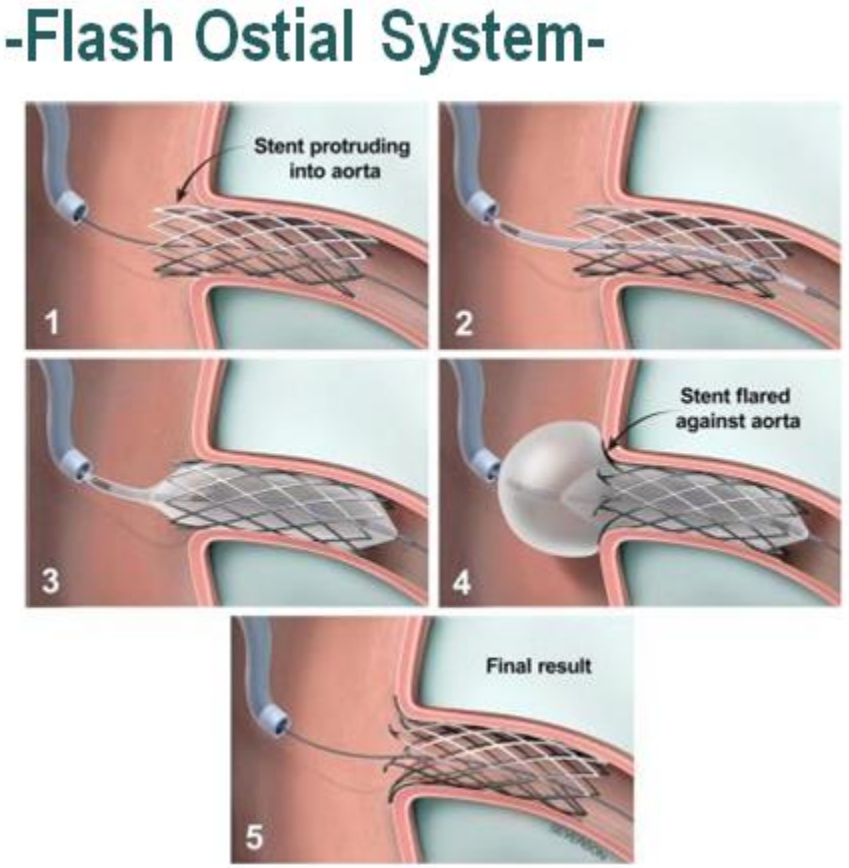
FFR of LCX is 0.94



4.

LM Stenting techniques

- **Ostio lesions**

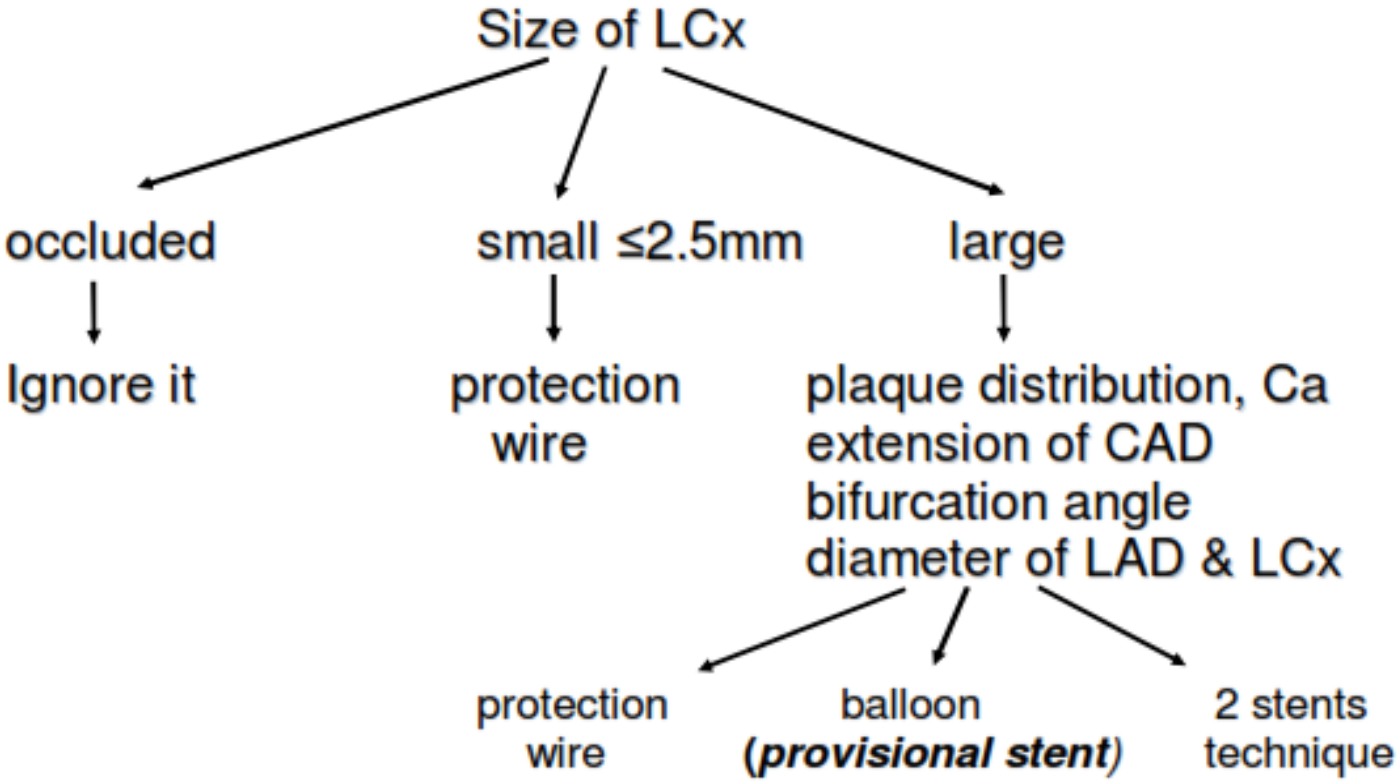


4.

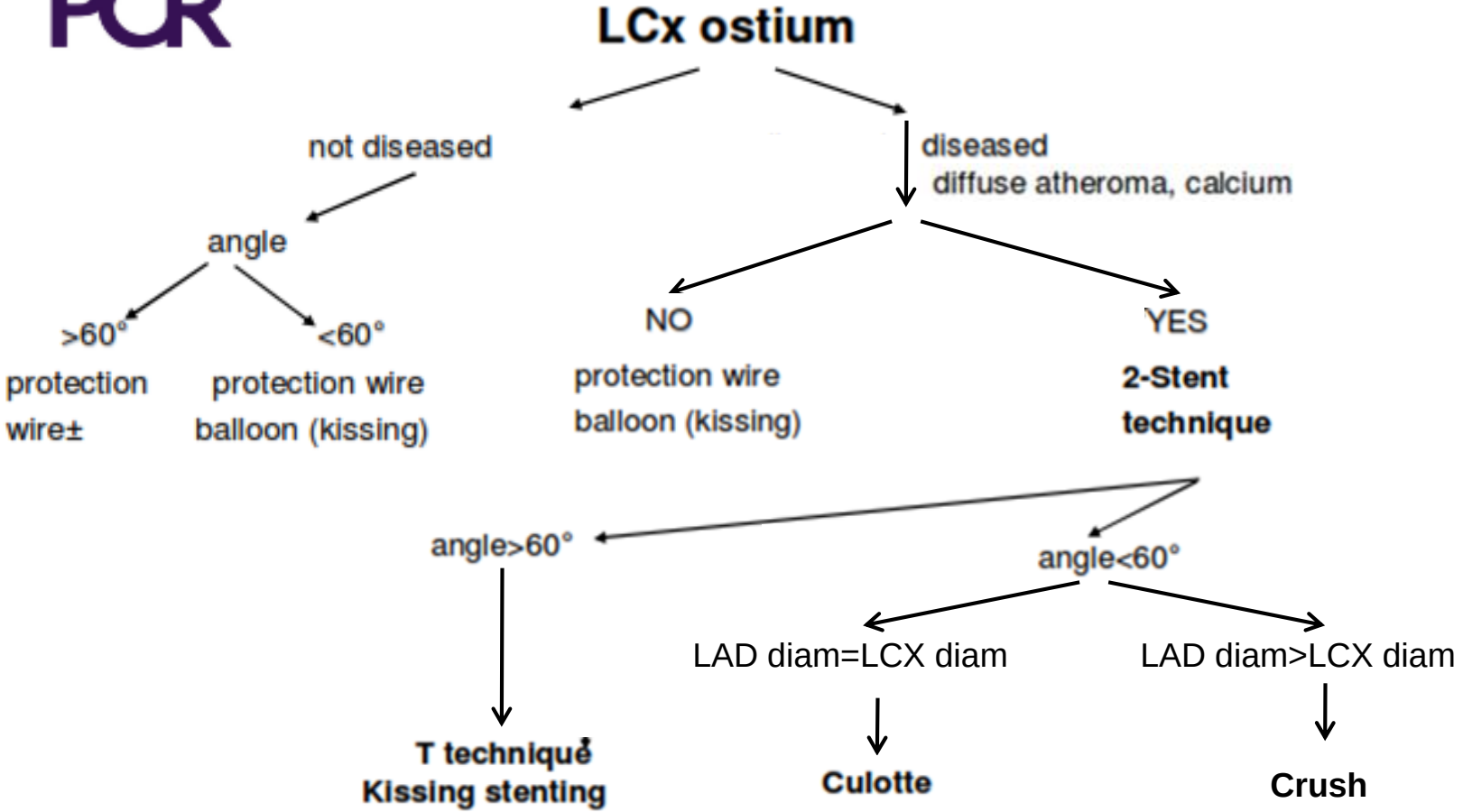
euro PCR

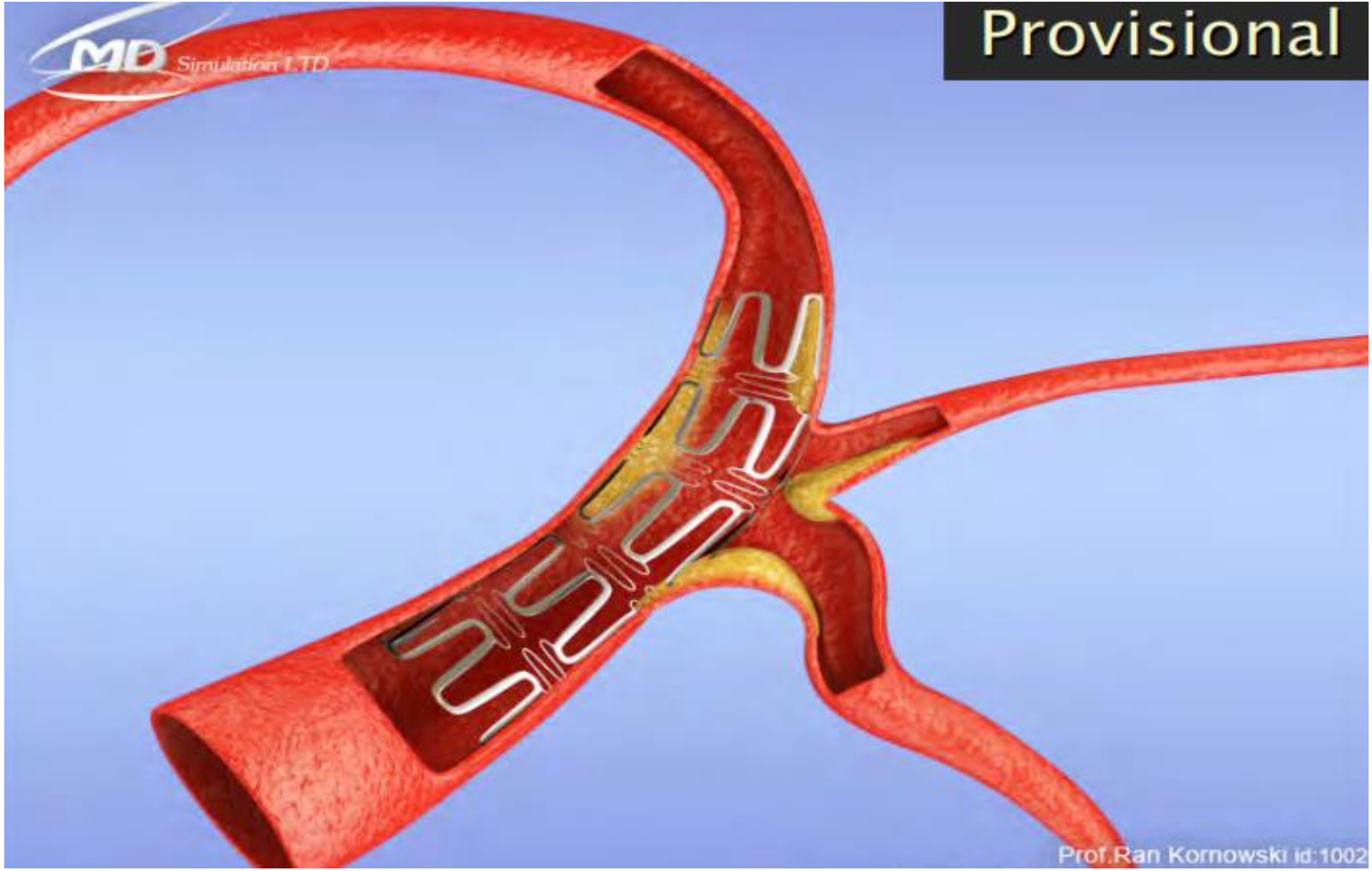
Strategy for distal LM lesion

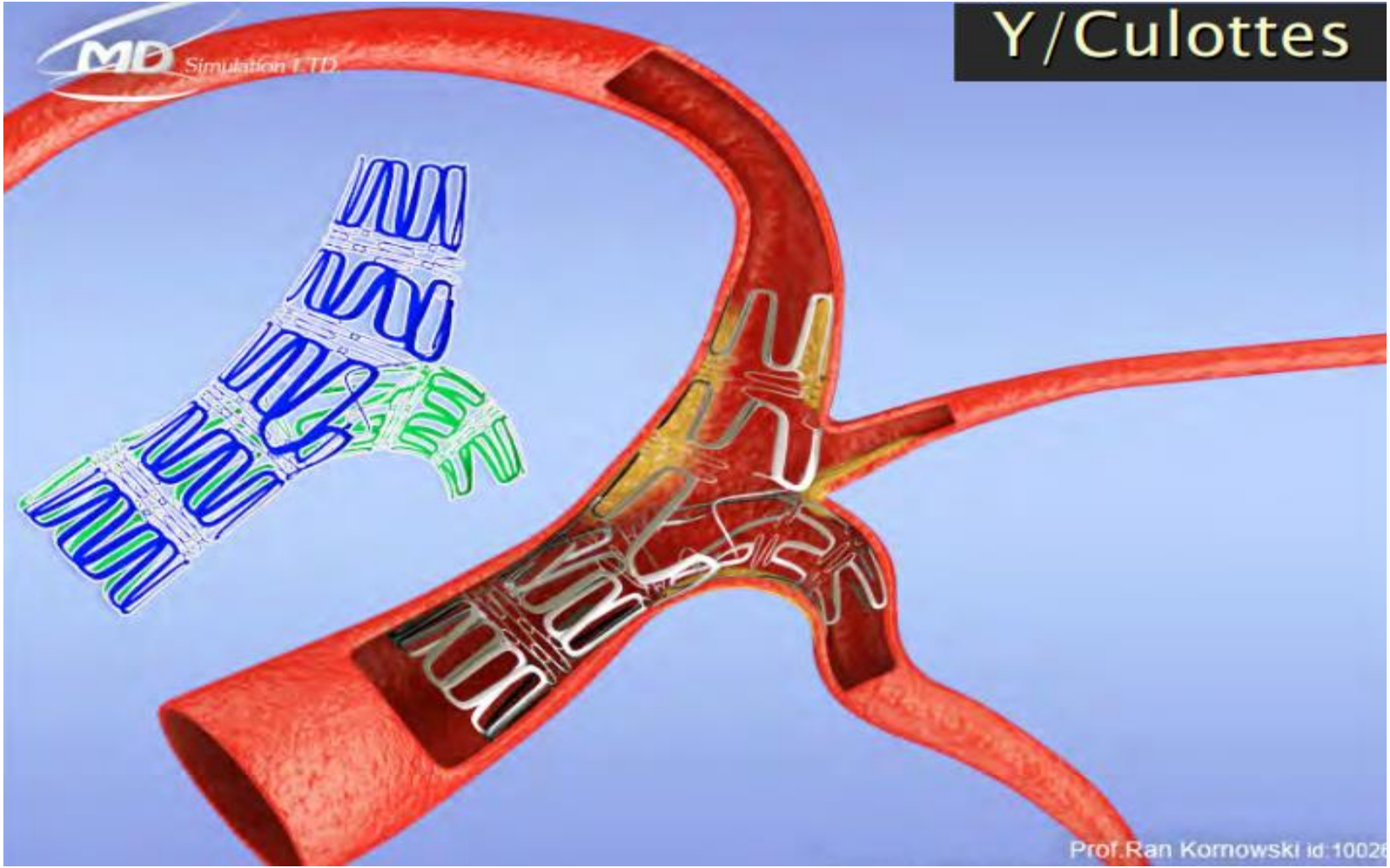
Bifurcation lesions
Trifurcation lesions

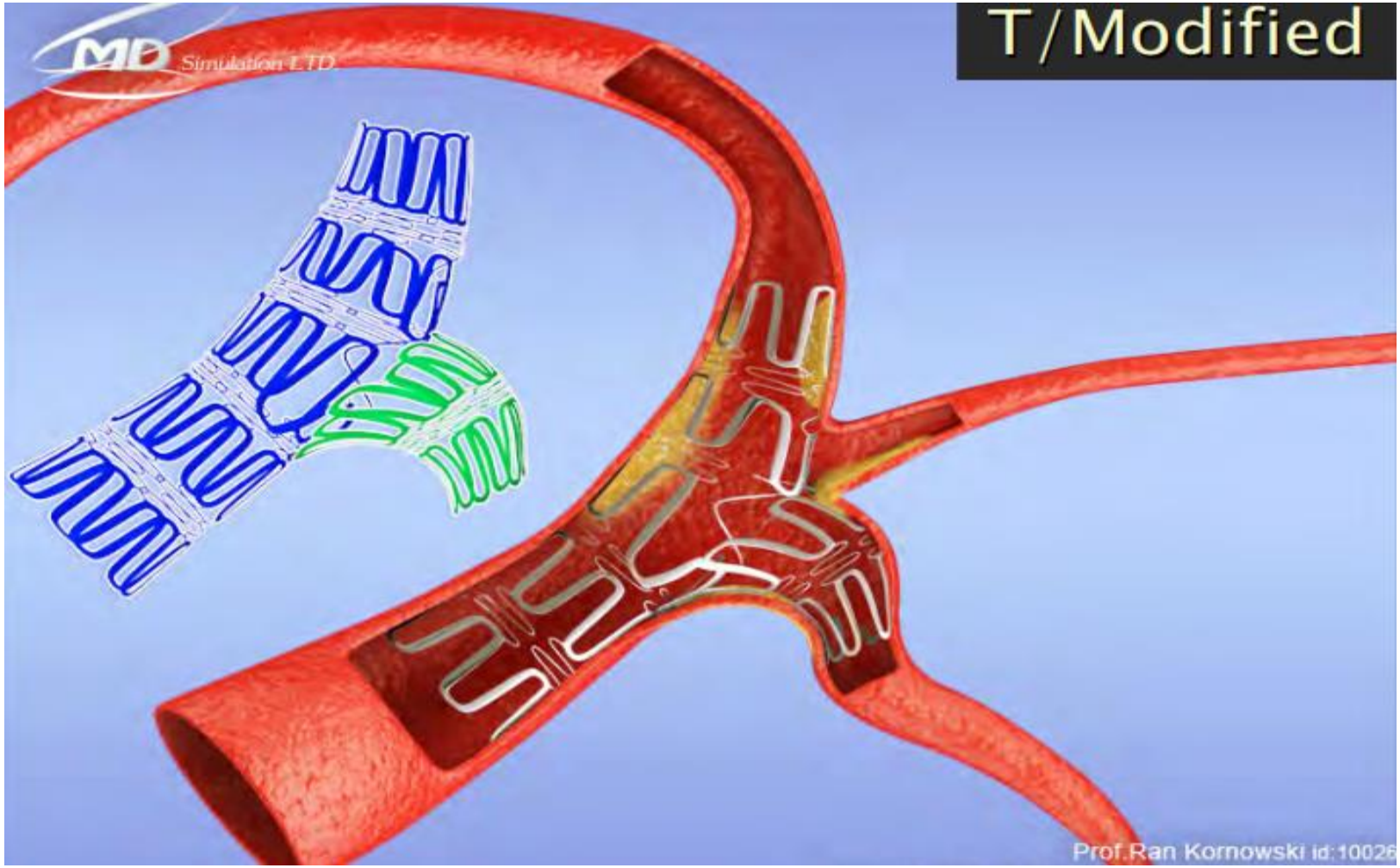


Strategy for distal LM lesion

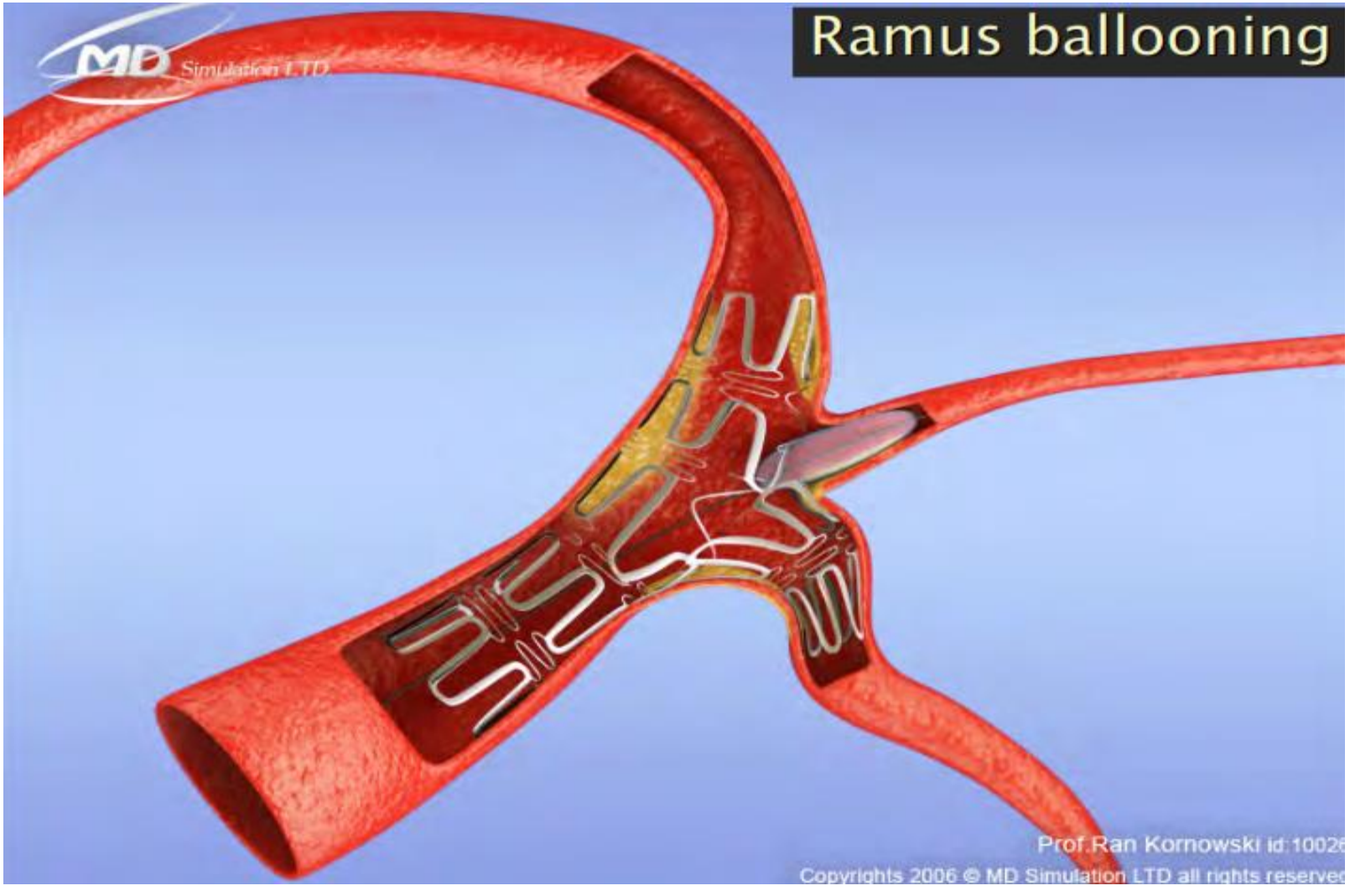



MD Simulation LTD
Provisional
Prof.Ran Kornowski id:1002


MD Simulation LTD.
Y/Culottes
Prof.Ran Kornowski id:10028


MD Simulation LTD.
T/Modified
Prof.Ran Kornowski id:10026


MD Simulation LTD
Crush
Mini-crush
DK - Crush
Prof.Ran Kornowski id:1002


MD Simulation LTD
Ramus ballooning
Prof.Ran Kornowski id:10026
Copyrights 2006 © MD Simulation LTD all rights reserved

Conclusions

- Main vessel + calcification + bifurcation lesion = Big challenge in leftmain PCI
- Overcome:

  - heart team,

  - support devices available

  - Intervention devices: IVUS/OCT, FFR, ROTABLATOR

  - strategies for distal LM stenting (bifurcation, trifurcation)

  - skill and experiences of the operators

Always do it for the patient !

Thank you for your attention !!!!