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**How Should I Treat:
Complex Distal Left Main II**

**Dr Rigatelli has not conflict of interest to disclose
in this presentation**



CASE: 11.10 am, Cath Lab 2, Rovigo General Hospital

Emergency call by 118 (our 111):

-Male, caucasian, 73 year-old

-symptom onset 10.45 am

-Transferred to primary referral center:

1-Troponin I° essay 8.7

2 -Inferior ,Lateral and Anterior STEMI

-medical history: hypertension, smoke habitus, hypercholesterolemia



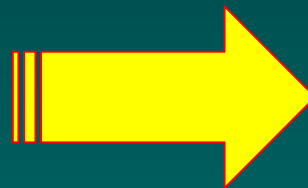
CASE: 11.25 am, Cath Lab 2, Rovigo General Hospital

After Brilique 2 cp, Heparin 5000 U and Flectadol 250 mg ev, the patient has been transferred to our Center for primary PCI. At his arrival:

-Angina still present

-Killip 2

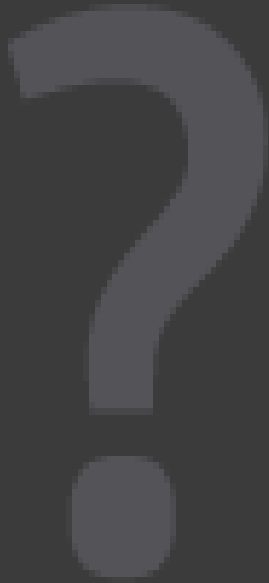
-Radial pulse present



Coronary angiography



Coronary Angiography Findings 1





Coronary Angiography Findings 1





How Should I Treat?

PRO

CONTRA

1. Deferral to surgery

**Complex LM:
distal+Ostia LAD-
LcX, Suboccluded
Ramus, Occuded
RCA**

**Unstability
AMI ongoing**

2. Complex PCI

**Pz on the table
Ready to do
Faster than trasfer**

**Impella unavailable
IABP unuseful (?)
Ramus high risk to
be lost
No time for IVUS**



**4 minutes after diagnostic (11.35 am),
pt crushed down....**

.....PAO 70/40 mmHg, Killip 3, angina worsened.....Ok , PCI

DISADVANTAGES

**Stenting LM to LAD
T stent LCx,
Protecting Ramus**

**Potential difficulties in gaining the LCx
after stenting LM-LAD, High risk to loose
the Ramus**

CULOTTE

**Not so quick to do, large amount of metal
into the LM, unfavourable angle**

DK Krush

**Time consuming, multiple kissing,
prolonged inflations**



What we need?

Operator needs:

1

Very quick easy technique with a few steps and low number of prolonged inflations

2

Easy recrossing of the jailed vessels

3

Ensuring patency of both LAD and LCx and eventually Ramus with low metal amount

Patient's needs:

1

Fast improvement of haemodynamics

2

Fast angina relieves

3

Acceptable long-term outcomes



My choice: Reverse Minimal (NANO) Crush



Step By Step inflation of both LM-LAD and LM-LCx with NC balloon 1:1 ratio



My choice: Reverse Minimal (NANO) Crush



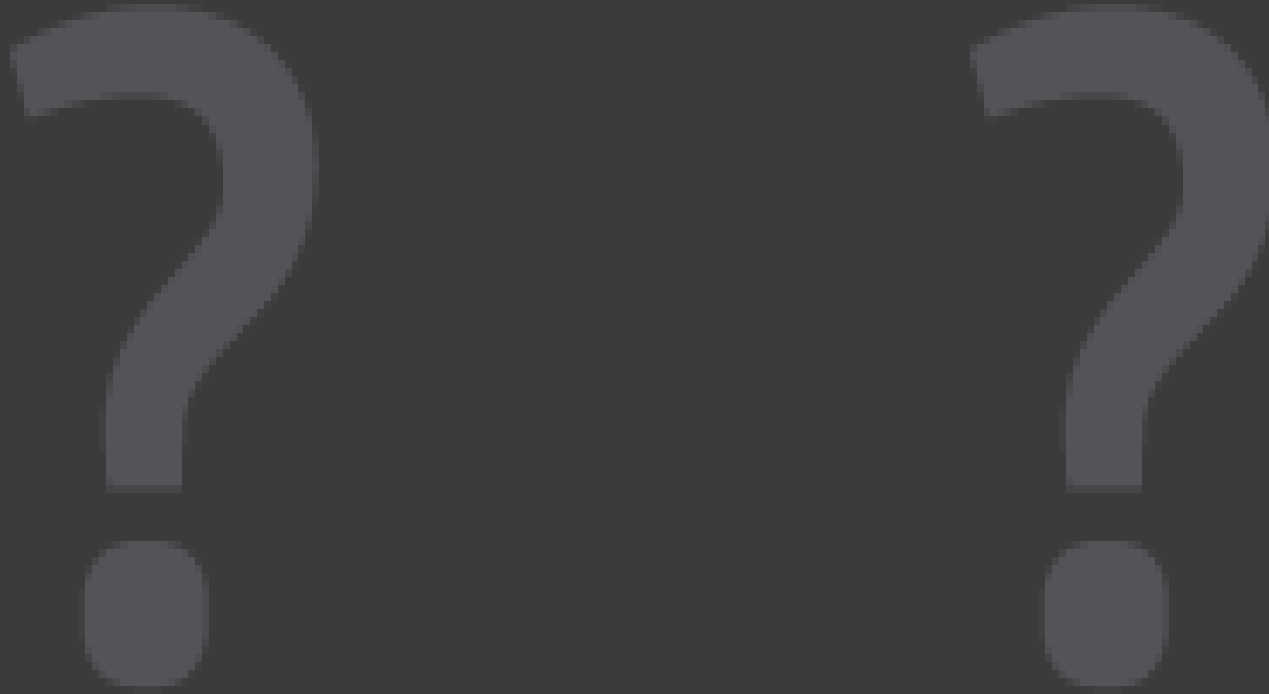
Inflation of Ramus



After initial predilatation



My choice: Reverse Minimal (NANO) Crush

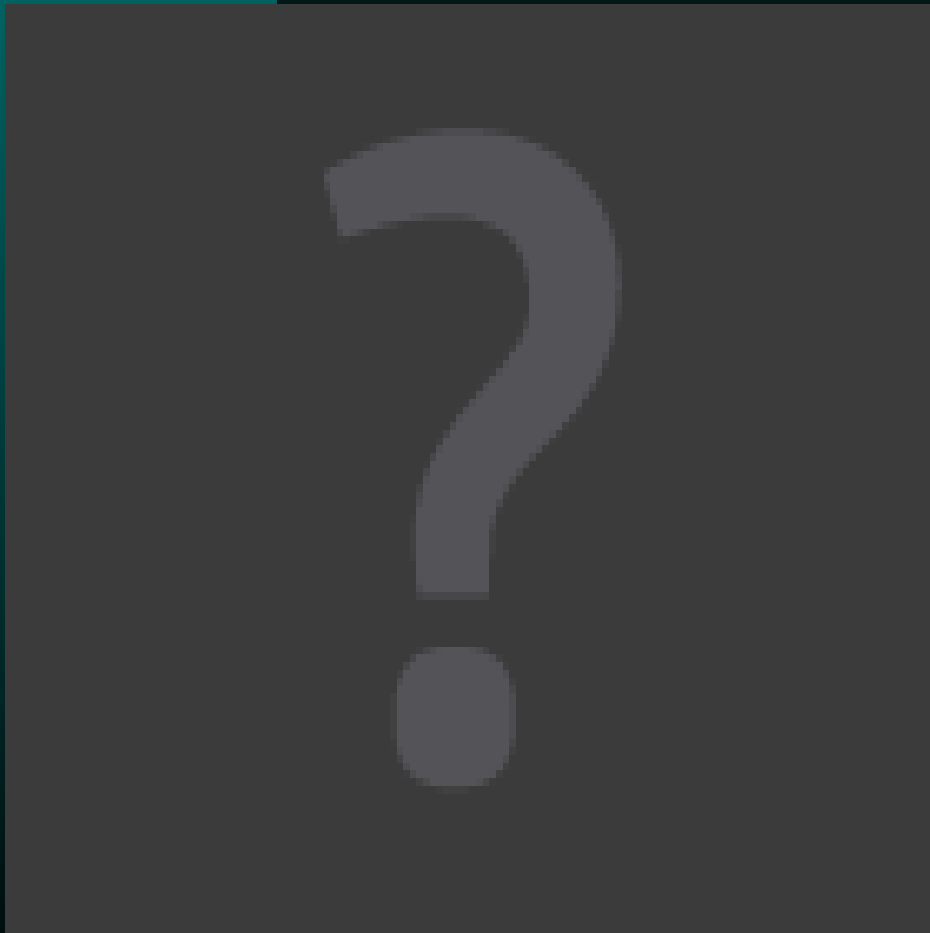


Stenting LM-LCx with Orsiro 3.5
x24

After stenting



My choice: Reverse Minimal (NANO) Crush



LCx NC Balloon withdrawing and
LAD Stent Crush at 20 atm

LAD Orsiro 3.5 x 18 stent protruding 1 cell+
distal NC 3.0 x 15 balloon in the LCx



My choice: Reverse Minimal (NANO) Crush



POT with short NC 4.0/6 mm balloon

Final Kissing with Nc balloon 20 atm



My choice: Reverse Minimal (NANO) Crush



Final result Spider view



Final result AP cranial view



At the end....

11.25 Pt arrival in the cath lab: coronary angiography

11.35 pt crushed down: pao 60/40 mmHg

11.36 PCI started

11.57 PCI ended: total contrast volume 137 ml

**Final aortic pressure 110/75 mmHg,
angina resolved completely in further 30 minutes,
Troponin peak 75 ng/ml**

**Discharged after 7 days hospital staying,
3-month FU: Anterolateral Q wave, EF 43%**



Some considerations...

Well known techniques for LM bifurcation:

- ✓ **DK crush**
- ✓ **Culotte**
- ✓ **T-stenting**
- ✓ **TAP**
- ✓ **Mini-crush**

Possible dark zone:

- ✓ Unknow impact of multiple layer of metal or metal+biopolymer into the carina >>> **Lower shear stress force**
- ✓ Applicability to a certain angle
- ✓ Not universal applicability to 6F radial approach
- ✓ Sometimes time and cost consuming



Concepts of Nano-crush

✓ **Minimal crush
(1 cell only possibly)**

✓ **Orsiro (Biotronik)
very thin strut
(60-80 Micron)**

✓ **Possibly applicable
in a large variety of
MB/SB angles**

- Minimizing the amount of metal into the carena using very thin stent struts
- Ensuring SB ostium coverage
- Enhancing simplicity
- Applicable to 6F radial sheath



Nano-crush: Steps

1

Intravascular ultrasound evaluation of the LAD/CX diameter and lesion length: pre-dilation using non-compliant balloons on the basis of IVUS findings with 1:1 ratio at nominal atmospheres (atm)

2

Wiring both branches

3

Predilate sequentially or simultaneously both branches with non-compliant balloons.

4

Stent deployment on Side Branch (SB) maintaining a non-compliant balloon of the same diameter of Main Branch (MB) into the MB

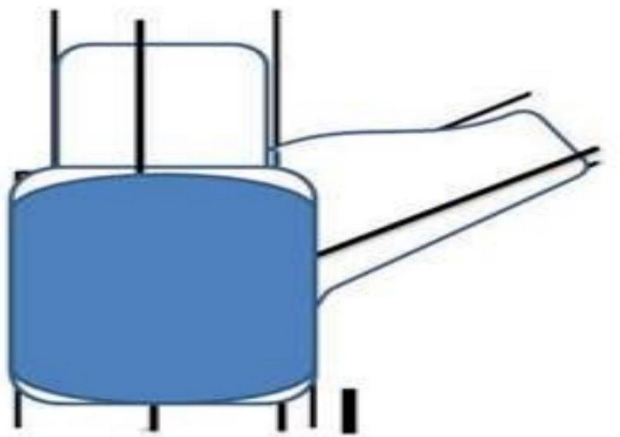
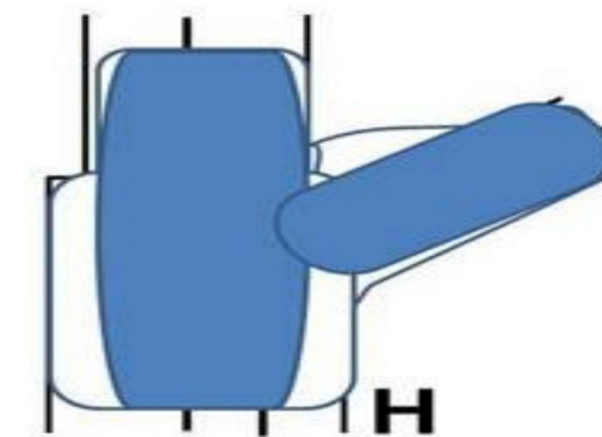
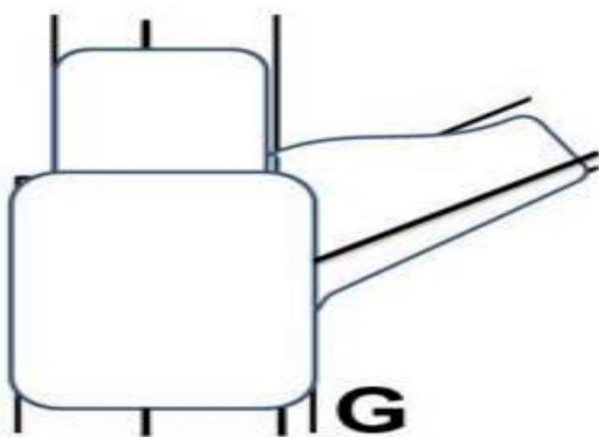
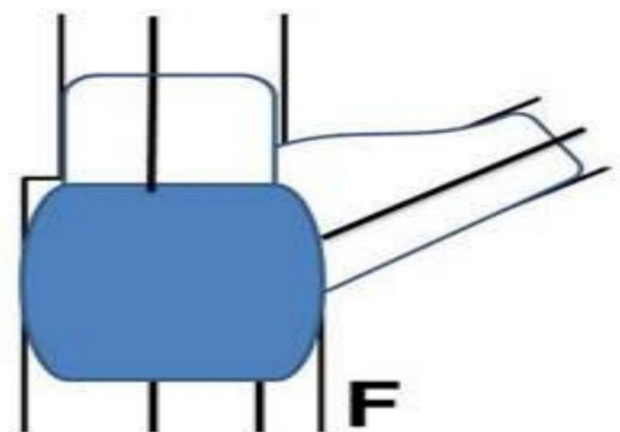
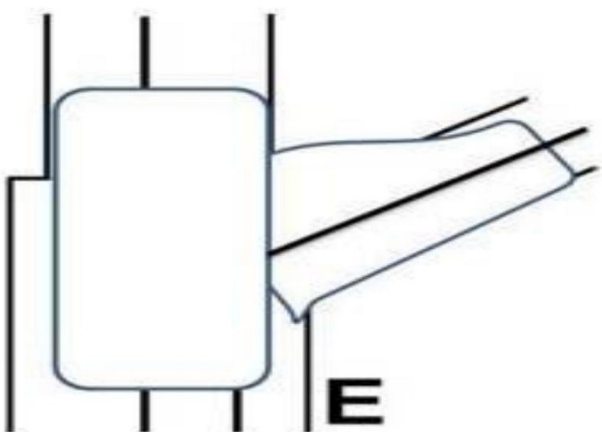
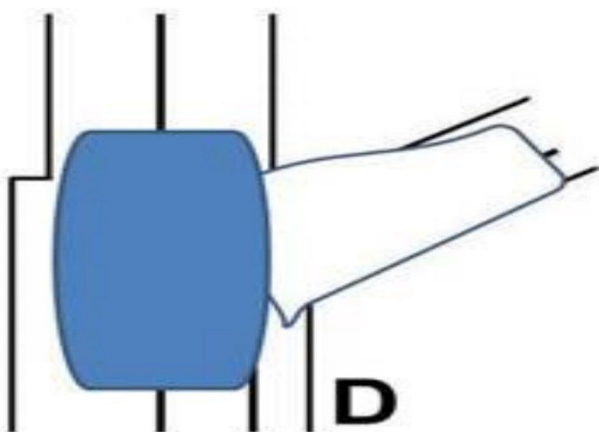
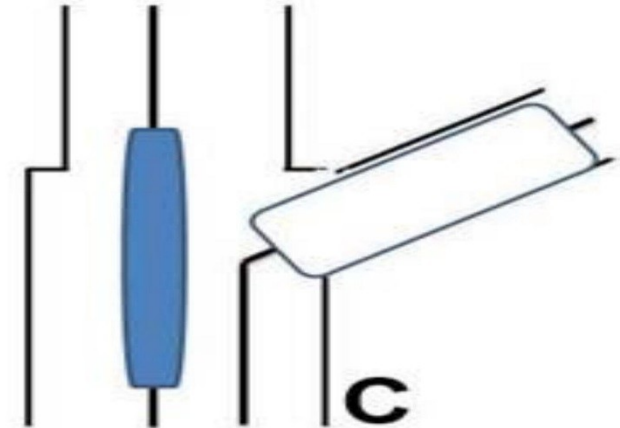
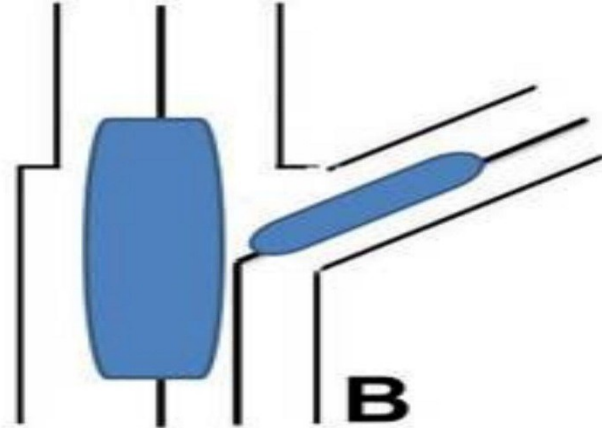
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Withdrawing the stent balloon of the deployed stent and inflating the main branch at high pressure (around 20 atm)



Nano-crush: Steps

- 6 Deploying the MB stent of the diameter of the distal reference diameter
- 7 Proximal optimization technique (POT) with non-compliant balloon of the same diameter of the main branch
- 8 Rewiring SB
- 9 Snuggle kissing overexpansion
- 10 Final re-POT.







Preliminary experience

	N° 14 (%)
Hypertension	12 (85.7)
Hypercholesterolemia	10(71.4)
Diabetes	7(50)
Smoking	10(71.4)
Valvular heart disease	2(14.2)
EF (%) (\pm SD)	45.2 \pm 8.6
CCS class (\pm SD)	2.4 \pm 0.7
Transient ischemic attack/stroke	1 (7.1)
Heart failure	3 (21.4)
Severe COPD	3 (21.4)
Peripheral arterial disease	4 (28.4)
Carotid artery disease	3 (21.4)
Rest angina	5(35.7)
Non-ST elevation ACS	9(54.3)
ST-elevation ACS	0(0)
1-vessel disease	0(0)
2-vessel disease	8(57.1)
3-vessel disease	6(42.8)
Medina classification	
0,1,1	4 (28.4)
1,1,1	10(71.4)
SINTAX score	23.3 \pm 7.2

- **As estimated by angiography the mean treated LM stenosis was 80.4 ± 10.6 % whereas it was 87.5 ± 9 . % by IVUS estimation.**
- **Mean angle between Left main (LM) and Left Circumflex (LCx) was $63.6 \pm 21.3^\circ$ (range 37 to 101°).**
- **The mean diameter and length of implanted stents was 3.9 ± 0.8 mm and 27.1 ± 8.7 mm in LM and 3.1 ± 0.3 mm and 22.1 ± 7.1 mm in LCx.**
- **Fluoroscopy time and procedural time were 12.7 ± 10.4 and 35.6 ± 9.2 minutes, respectively**



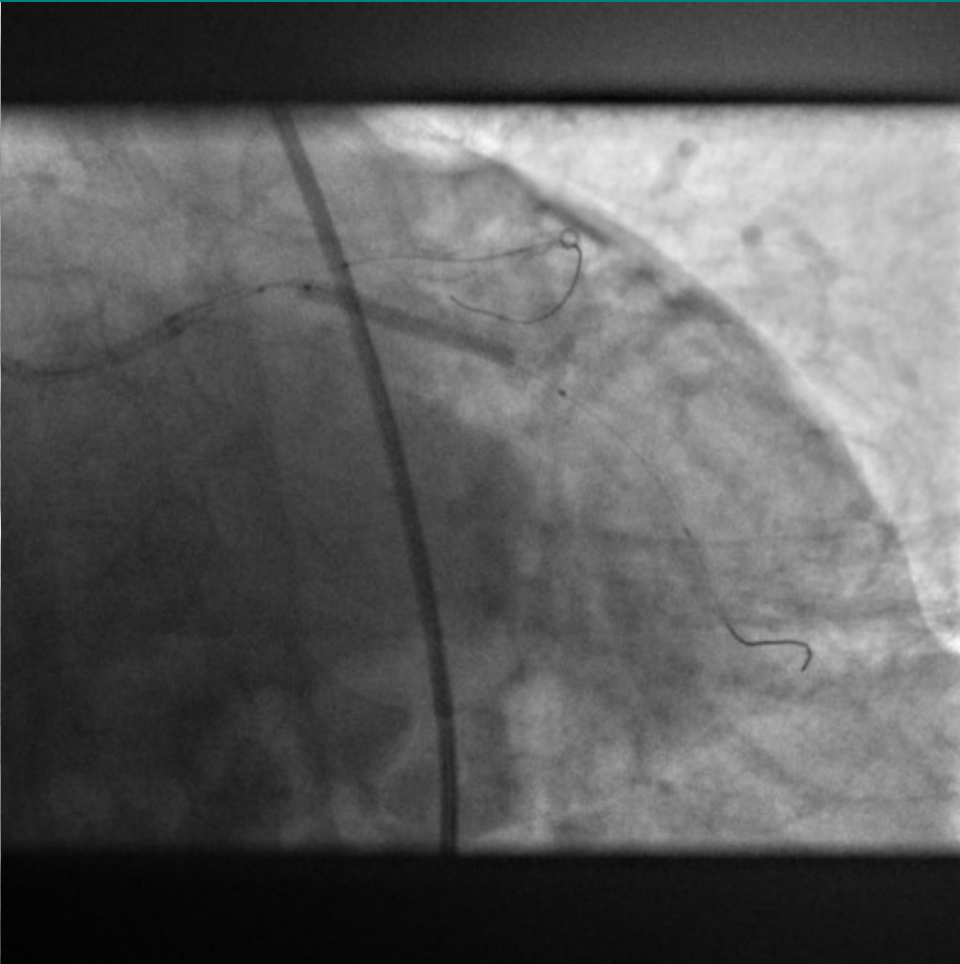
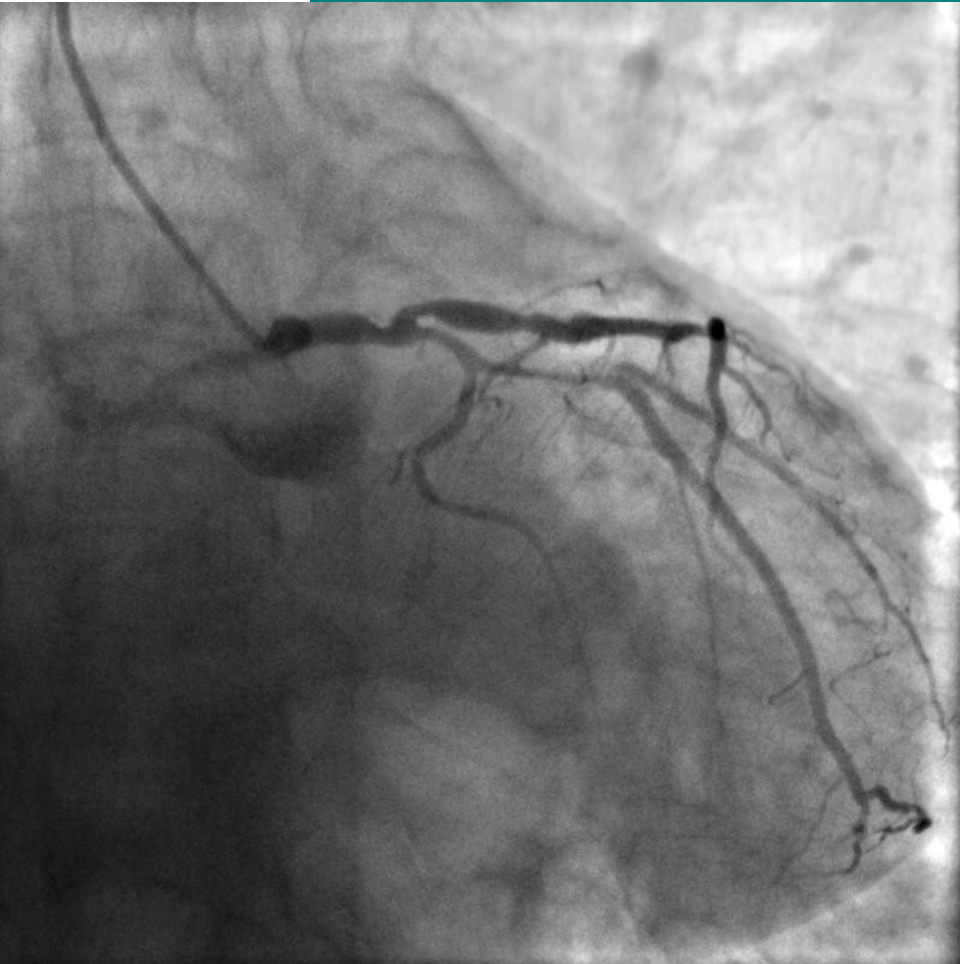
Preliminary experience: follow-up

- **Angiographic follow-up was available in 8/14 patients (57.1%) at a mean time from the procedure of 6.4 ± 0.5 months and showed no significant angiographic restenosis .**
- **Clinical follow-up was available for 100% of patients : at a mean follow-up of 8.0 ± 2.6 months, no patient death, or acute myocardial infarction, stent thrombosis or TVR were observed.**

Vessel	QCA					IVUS		
	Baseline			Post	FU	Baseline	Post	FU
	Ca	MLD	%	MLD	MLD	MLA	CSA	CSA
DLM	5/8(62.5)	1.9 ± 1.2	80.4 ± 10.6	4.2 ± 0.7	4.1 ± 0.9	2.10 ± 0.8	10.2 ± 0.5	9.9 ± 0.7

OWNED!







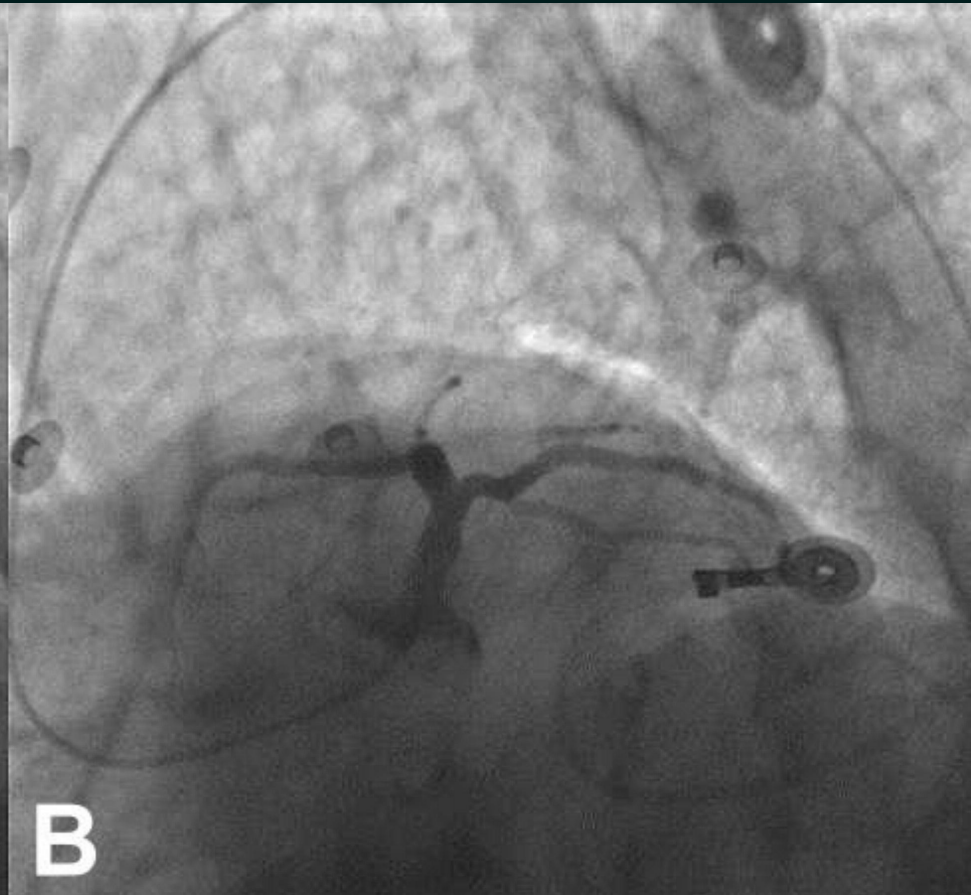


Immediate





7 months follow-up






Take Home Messages

Cardiogenic shock patients with distal/bifurcation LM are really sick patients:

1. Consider simple easy technique
2. Avoid multiple crushing
3. Avoid multiple long balloon inflations
4. Avoid multiple stent recrossing



**Be Quick
Be effective**



**AVOID BAD CRUSH IN
Unstable LM COMPLEX
CASES**