

Left Main Intervention: My Approach

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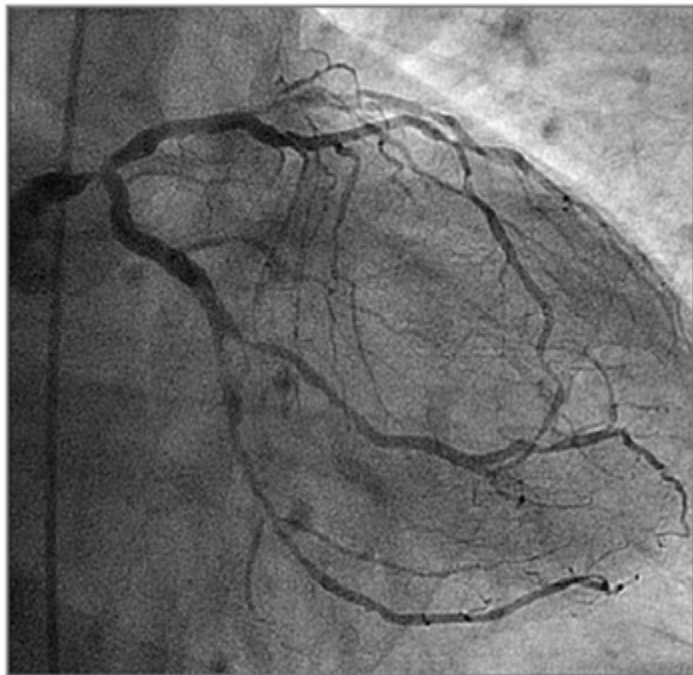
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Governor of ACC Chapter in Egypt

LMCA Disease



Distal location
>70% of cases

Calcified
>50% of cases

MVD
>70% of cases

Table 3 Recommended risk stratification scores to be used in candidates for percutaneous coronary intervention or coronary artery bypass grafting

Score	Calculation	Number of variables used to calculate risk		Validated outcomes	Class ^a /level ^b		Ref. ^c
		Clinical	Angiographic		PCI	CABG	
EuroSCORE	www.euroscore.org/calc.html	17	0	Short- and long-term mortality	IIb B	I B	2, 3, 6
SYNTAX score	www.syntaxscore.com	0	11 (per lesion)	Quantify coronary artery disease complexity	IIa B	III B	4
Mayo Clinic Risk Score	(7, 8)	7	0	MACE and procedural death	III C	III C	—
NCDR CathPCI	(5)	8	0	In-hospital mortality	IIb B	—	5
Parsonnet score	(9)	16	0	30-day mortality	—	III B	9
STS score ^d	http://209.220.140.181/STSWebRiskCalc261/	40	2	Operative mortality, stroke, renal failure, prolonged ventilation, deep sternal infection, re-operation, morbidity, length of stay <6 or >14 days	—	I B	10
ACEF score	$[\text{Age}/\text{ejection fraction (EF)} + 1]$ (if creatinine >2 mg/dL)(11)	2	0	Mortality in elective CABG	—	III C	—

^aClass of recommendation.^bLevel of evidence.^cReference.^dThe STS score is undergoing periodic adjustment, which makes longitudinal comparisons difficult.

ACEF = age, creatinine, ejection fraction; CABG = coronary artery bypass grafting; MACE = major adverse cardiac event; NCDR = National Cardiovascular Database Registry; PCI = percutaneous coronary intervention; STS = Society of Thoracic Surgeons.



Guidelines on myocardial revascularization

The Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)

Developed with the special contribution of the European Association for Percutaneous Cardiovascular Interventions (EAPCI)[‡]

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Table 9 Indications for coronary artery bypass grafting vs. percutaneous coronary intervention in stable patients with lesions suitable for both procedures and low predicted surgical mortality

Subset of CAD by anatomy	Favours CABG	Favours PCI	Ref.
IVD or 2VD - non-proximal LAD	IIb C	I C	—
IVD or 2VD - proximal LAD	IA	IIa B	30, 31, 50, 51
3VD simple lesions, full functional revascularization achievable with PCI, SYNTAX score ≤ 22	IA	IIa B	4, 30–37, 53
3VD complex lesions, incomplete revascularization achievable with PCI, SYNTAX score > 22	IA	III A	4, 30–37, 53
Left main (isolated or IVD, ostium/shaft)	IA	IIa B	4, 54
Left main (isolated or IVD, distal bifurcation)	IA	IIb B	4, 54
Left main + 2VD or 3VD, SYNTAX score ≤ 32	IA	IIb B	4, 54
Left main + 2VD or 3VD, SYNTAX score ≥ 33	IA	III B	4, 54

Revascularization to Improve Survival: Left Main CAD Revascularization



CABG to improve survival is recommended for patients with significant ($\geq 50\%$ diameter stenosis) left main CAD.



PCI to improve survival is reasonable as an alternative to CABG in selected stable patients with significant ($\geq 50\%$ diameter stenosis) unprotected left main CAD with: 1) anatomic conditions associated with a low risk of PCI procedural complications and a high likelihood of a good long-term outcome (e.g., a low SYNTAX score [≤ 22], ostial or trunk left main CAD); and 2) clinical characteristics that predict a significantly increased risk of adverse surgical outcomes (e.g., STS-predicted risk of operative mortality $\geq 5\%$).



Factors to be Considered in LM Intervention

Prognostic Factors

Emergency
Vs.
Elective Intervention

High-Risk
Vs.
Low-Risk Patient

Technical Considerations

Isolated LM vs. LM + other
major epicardial vessels

Aorto-ostial/Shaft location
vs.
Bifurcation/Trifurcation

Use of Support Devices

Use of Debulking Devices

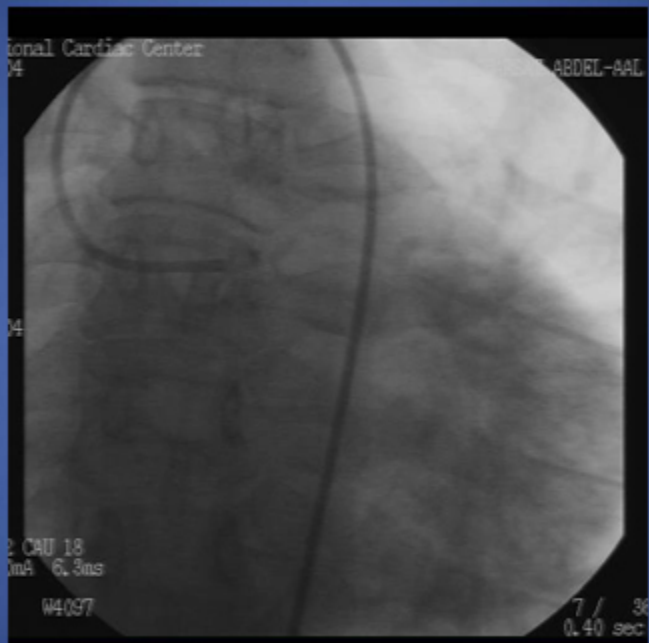
Use of IVUS

Technique for
bifurcation treatment

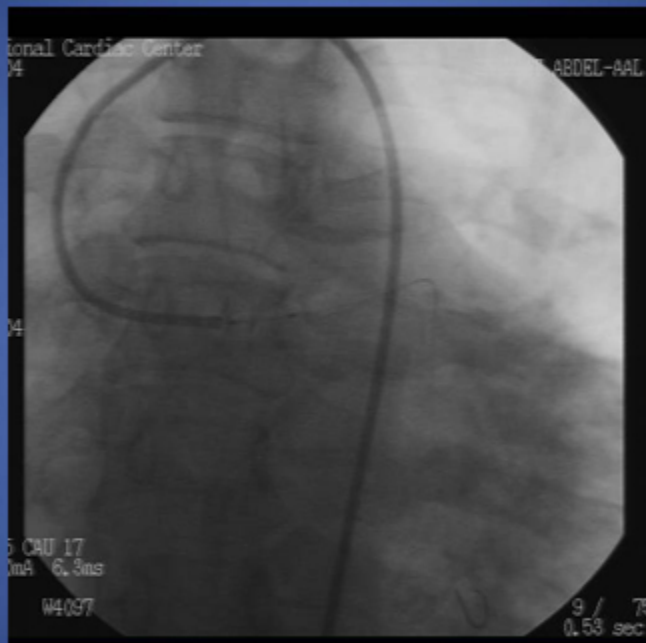
- Crush
- Culotte
- V stenting
- T stenting
- Final kissing balloon
inflation

Ostial left Main

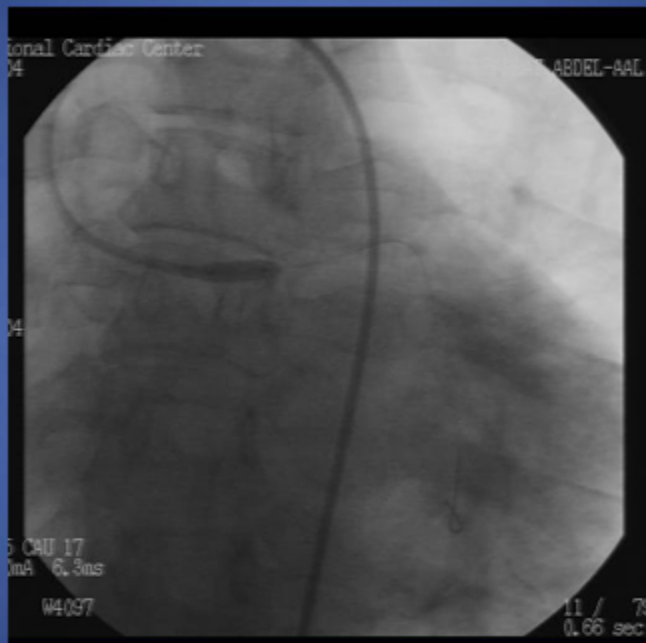
99% Lesion in ostial LMCA



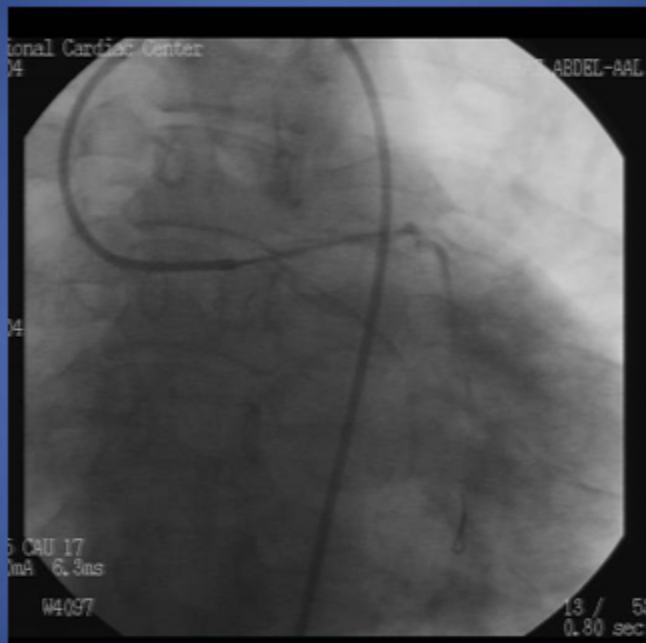
Predilatation with short Balloon



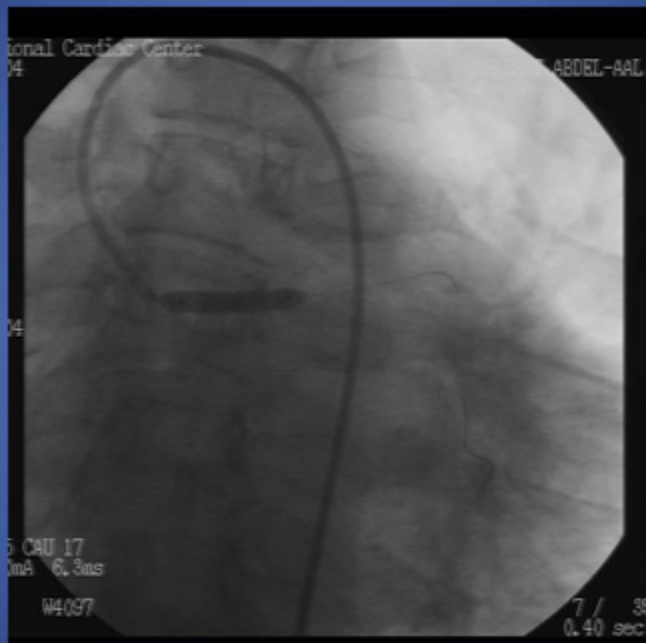
Stent deployment



After stent deployment



Post inflation and flaring

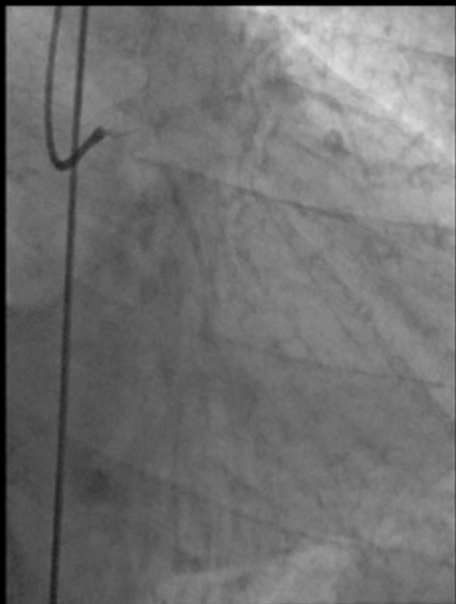


Final result

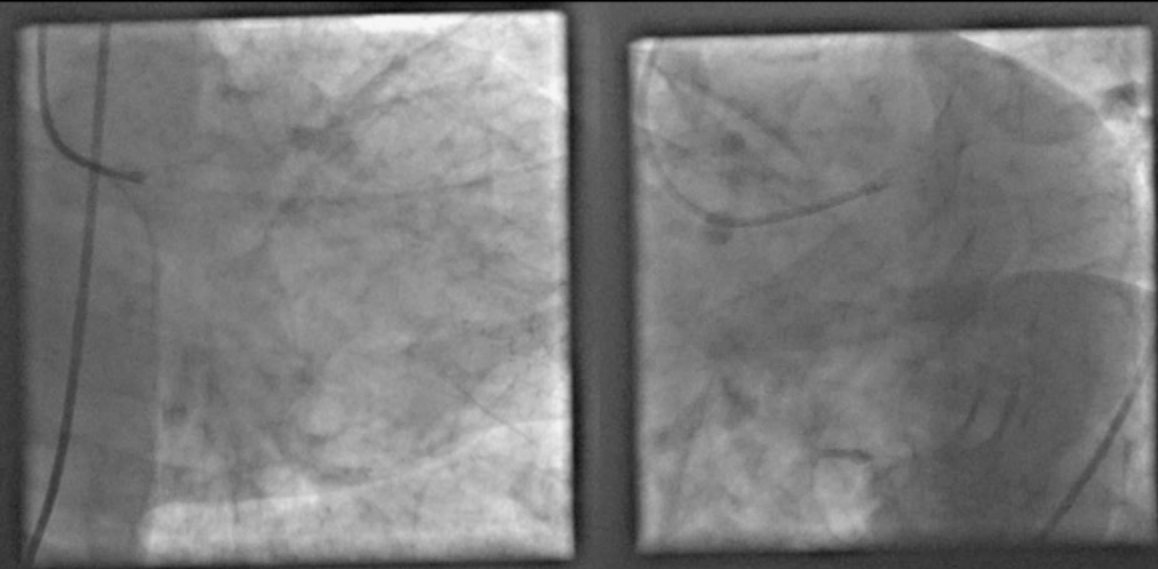


Body (Mid-shaft) Left Main

Mid-shaft LM lesion



Direct Stenting with DES after IVUS



DES for Ostial and Shaft LMCA stenosis

No Mortality

No Restenosis,

No TLR rate

No more surgery...

Distal Left Main Bifurcation

Revascularization for UPLMT

Lesion Complexity and Location

Bifurcation Angle

Differences in vessel size. Mismatch

Single vs double stent

Which double stent technique

Maximal stent diameter

Need for IVUS

Different Treatment Strategy

Unprotected Left Main Bifurcation Stenting

Stenting Cross Over

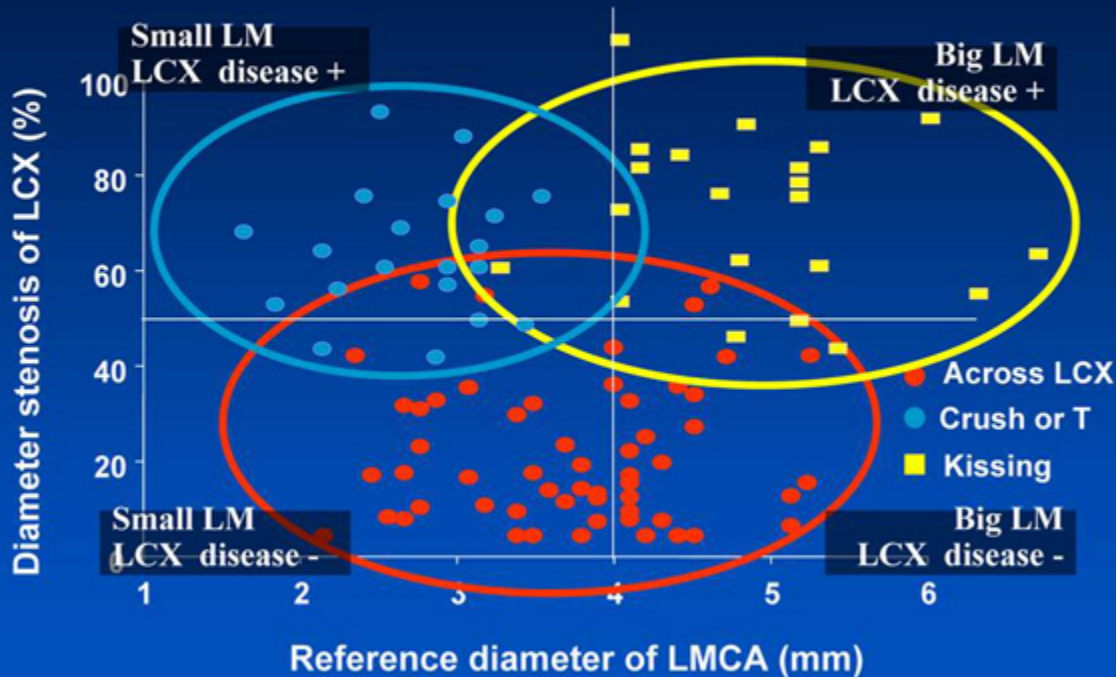
Kissing Stenting

Stent Crushisng

T-stent technique

Different Stenting Techniques

according to LM size and LCX ostial stenosis

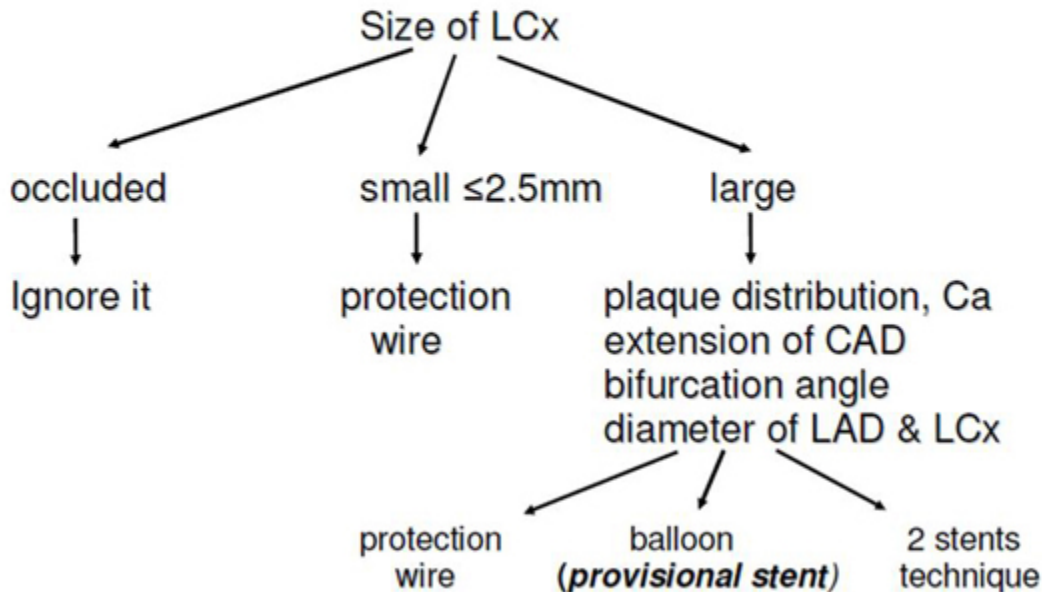


Distal Left Main Lesion

The LCx is one of the key elements for indication of Left Main PCI

- . size
- . area of jeopardized myocardium
- . ostial location of atheroma plaque
- . diffusion of atheroma
- . bifurcation angle

Strategy for distal LM lesion



Strategy for Distal LM Lesion

LCX Ostium

Not Diseased

Angle

>60

**Protection
wire +/-**

<60

**Protection
wire Balloon
(kissing)**

Diseased

Diffuse Atheroma, calcium

NO

**Protection
wire Balloon
(kissing)**

YES

Stent Technique

Angle>60

**T-Technique
Kissing
Stenting**

Angle<60

**Culotte
Crush**

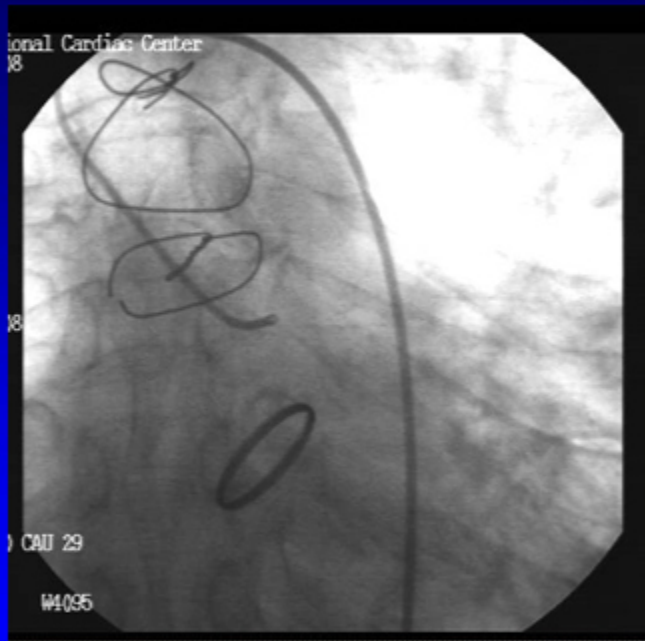
Commonly Used Bifurcation Techniques

- Provisional Stent Technique
- Crush and Mini-Crush Techniques
- Simultaneous Kissing Stent Technique (SKS)
- TAP Technique
- Culotte Technique

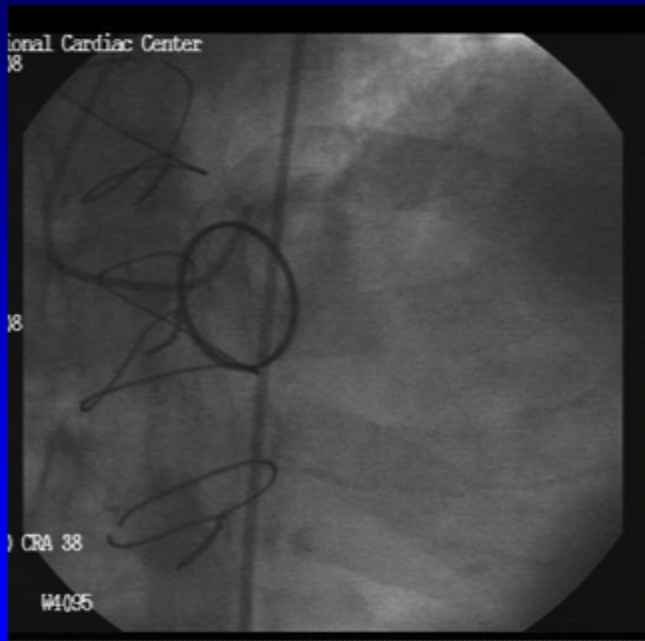
Clinical Data

- Male Patient 78 y non diabetic
- Aortic valve prosthesis (mechanical) 10 years ago with SVG graft to RCA
- Carotid stenting 7 years ago
- Recent progressive angina.
- ECG shows ST depression in anterior leads
- Echo shows hypokinesia of anterolateral wall with EF 57%
- Coronary angio was decided

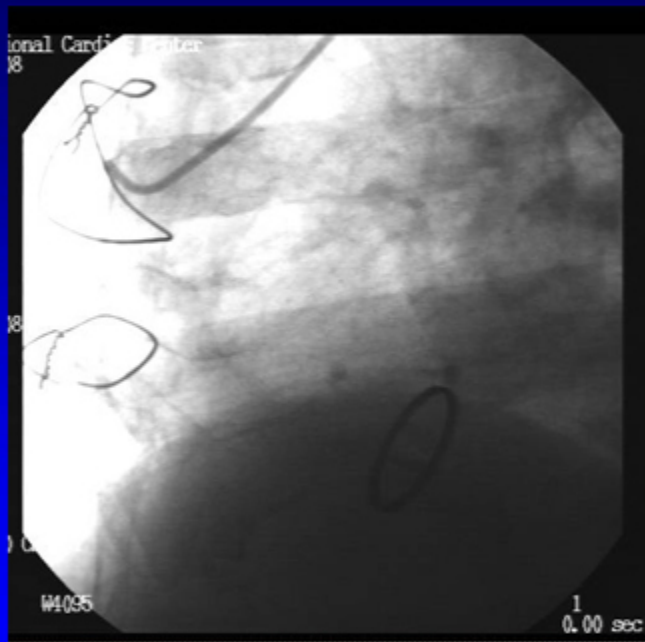
Distal LM lesion Medina 1,1,1



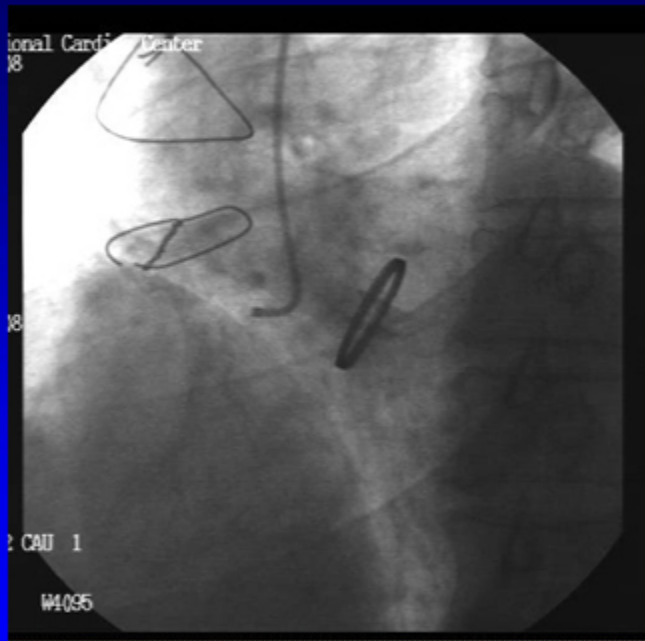
Proximal LAD 90%



Total Occlusion of SVG to RCA



RCA long lesion proximal 80% to 90%



High SYNTAX SCORE 32
High EUROSCORE 6

PCI IS MANDATORY

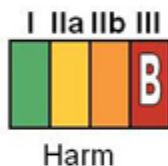
Revascularization to Improve Survival: Left Main CAD Revascularization (cont.)



PCI to improve survival may be reasonable as an alternative to CABG in selected stable patients with significant ($\geq 50\%$ diameter stenosis) unprotected left main CAD with: 1) anatomic conditions associated with a low to intermediate risk of PCI procedural complications and an intermediate to high likelihood of good long-term outcome (e.g., low-intermediate SYNTAX score of < 33 , bifurcation left main CAD); and 2) clinical characteristics that predict an increased risk of adverse surgical outcomes (e.g., moderate-severe chronic obstructive pulmonary disease, disability from previous stroke, or previous cardiac surgery; STS-predicted risk of operative mortality $> 2\%$).



Revascularization to Improve Survival: Left Main CAD Revascularization (cont.)



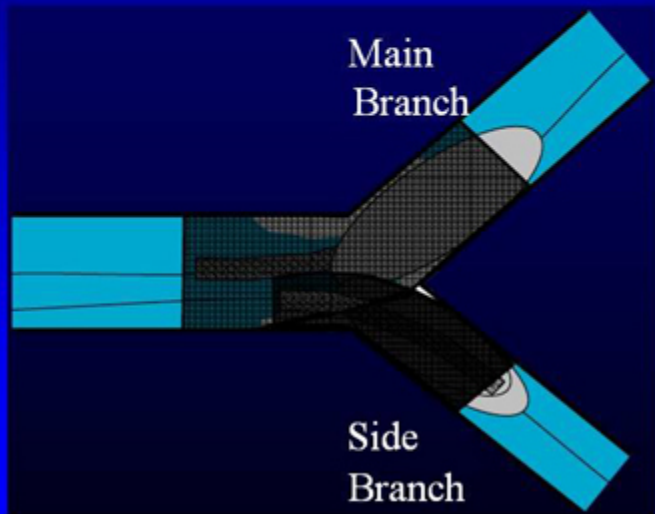
PCI to improve survival **should not be performed** in stable patients with significant ($\geq 50\%$ diameter stenosis) unprotected left main CAD who have unfavorable anatomy for PCI and who are good candidates for CABG.



Helping Cardiovascular Professionals
Learn, Advance, Heal.



The Crush Technique



Wire both vessels

Pre-dilate as needed

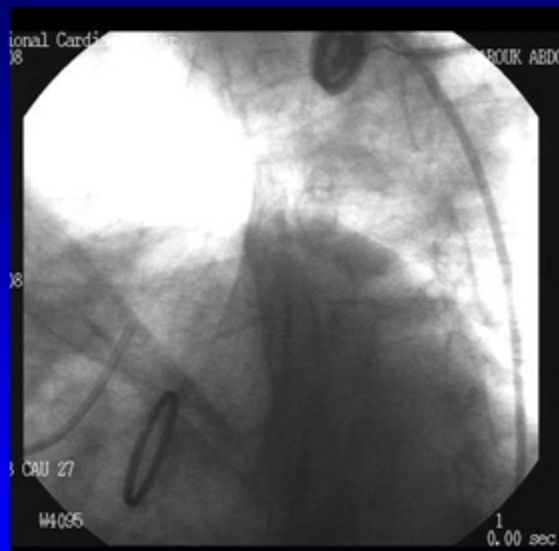
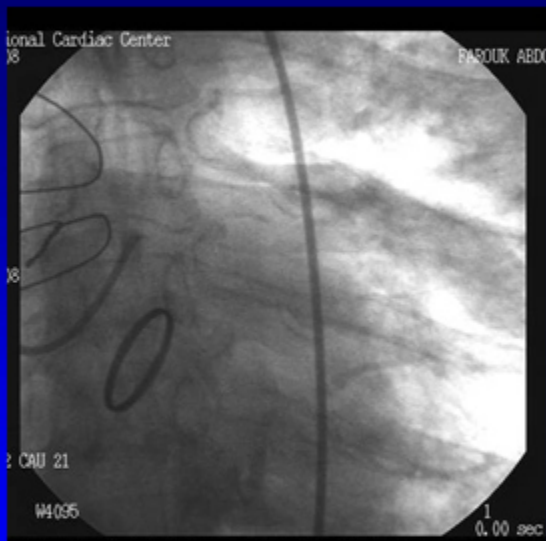
Position stents

Deploy side branch stent,
remove balloon/wire

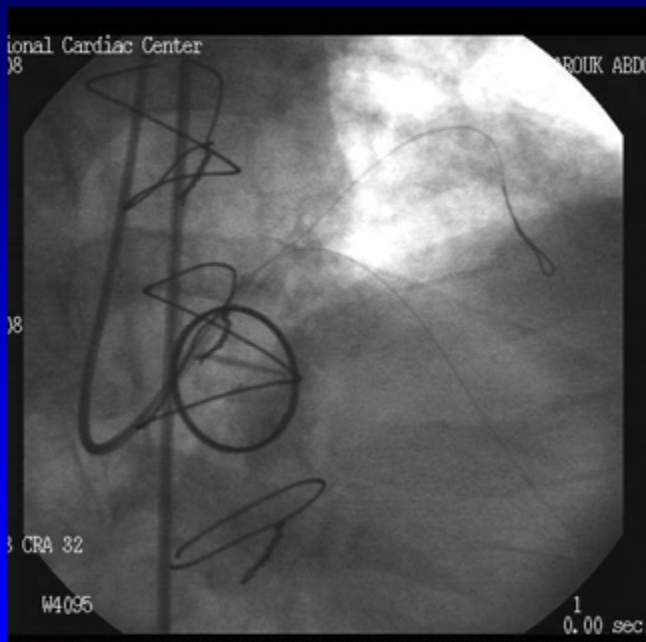
Deploy main branch stent-
'crushes' side branch
stent

Rewire side branch and
perform kissing balloon
inflation

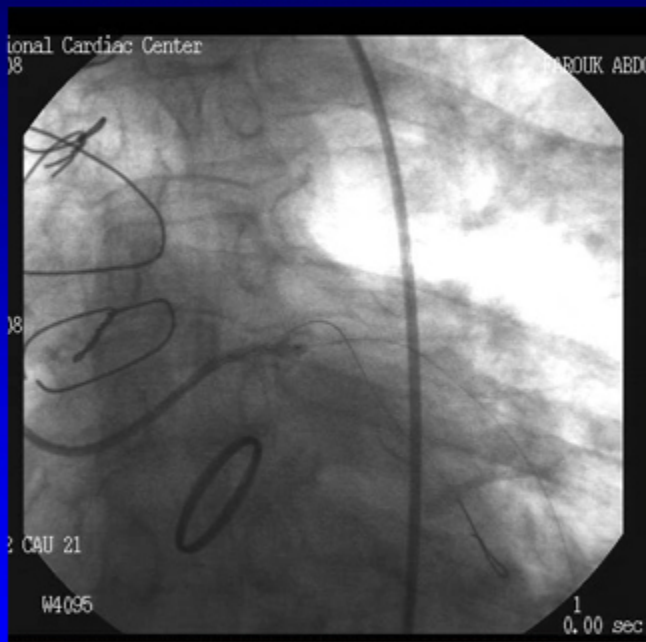
Control Views Before PCI



Two wires in LAD and CX



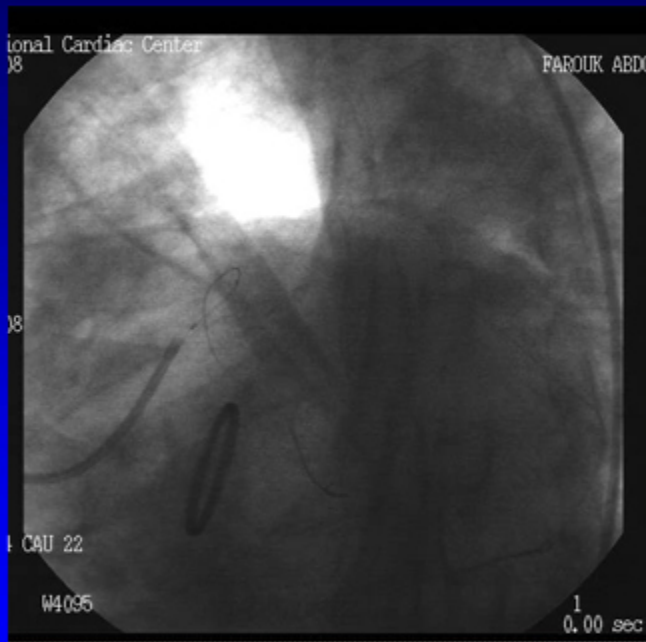
Balloon inflation in CX



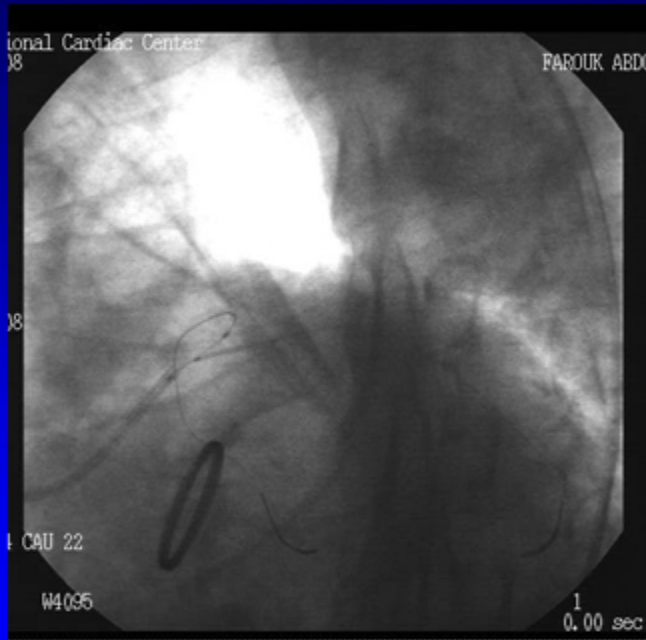
After inflation



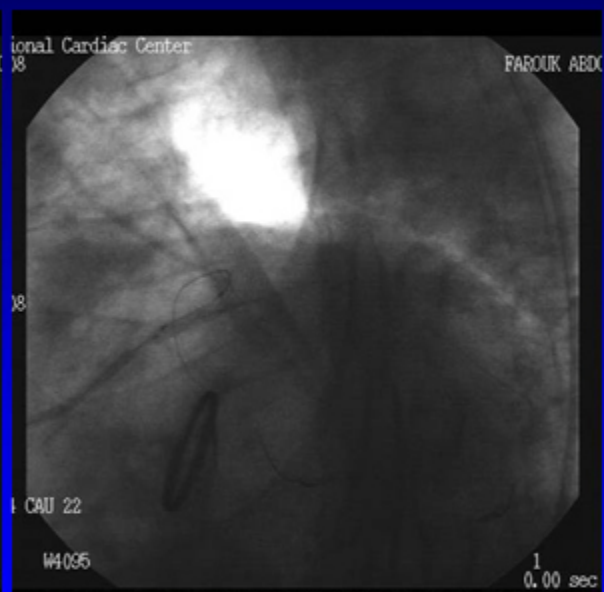
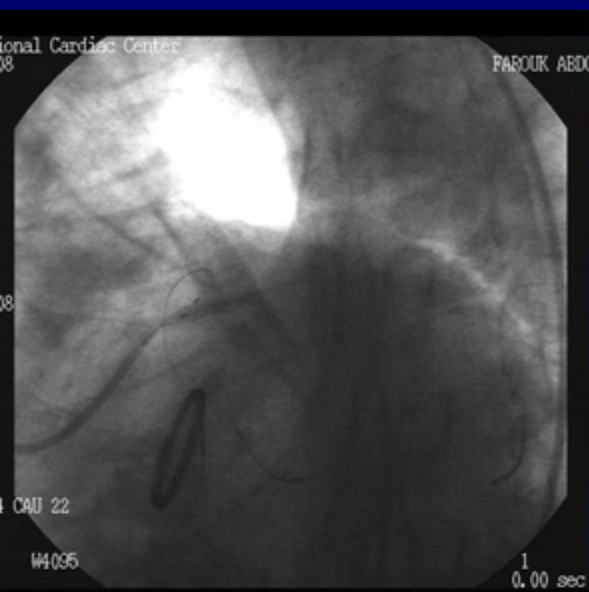
Balloon dilatation of LAD



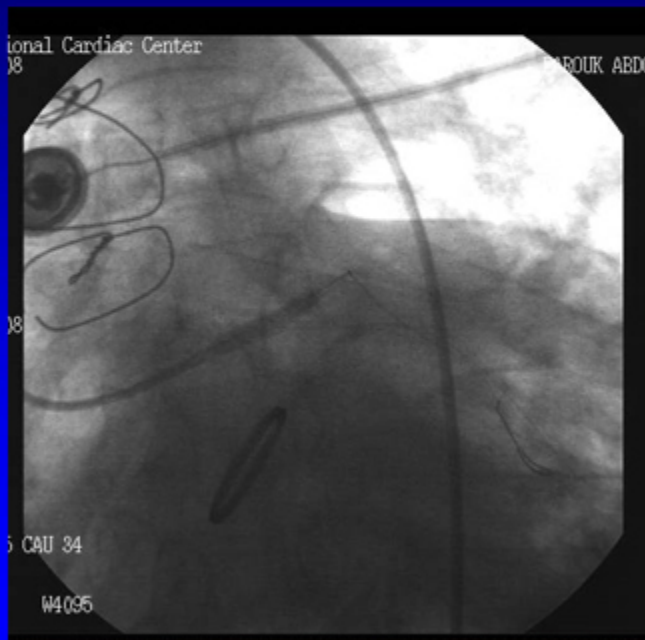
Two Stents in LAD and CX (DES)



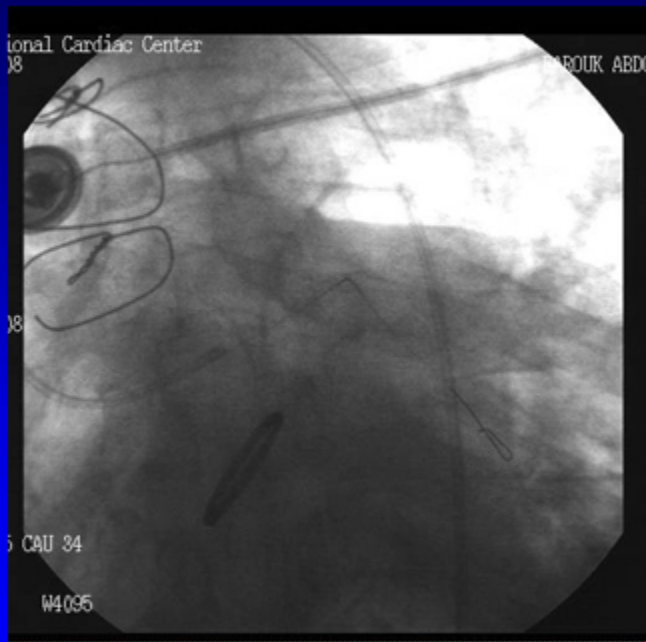
Stent deployment in CX



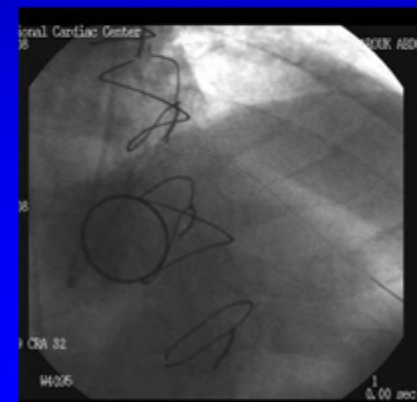
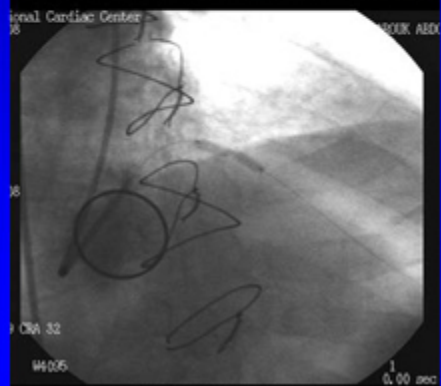
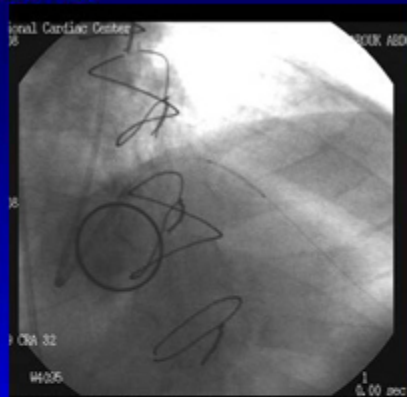
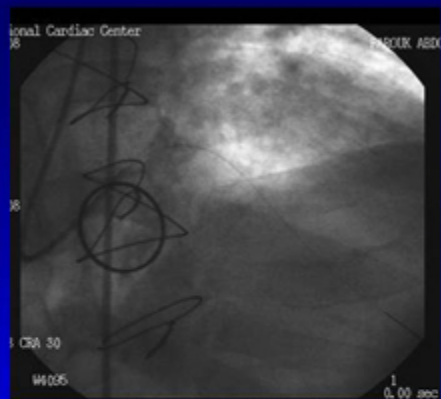
Wire Removal from CX, Stent deployment in LAD and LM



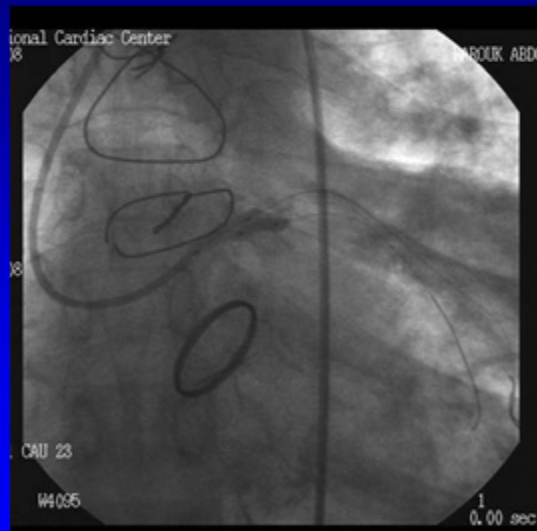
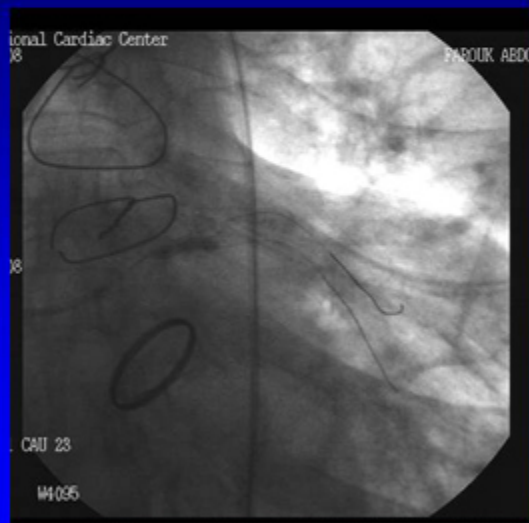
After deployment two Stents (LAD and CX)



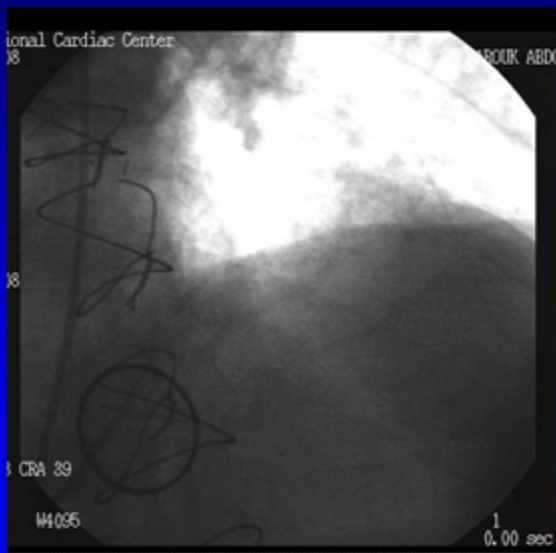
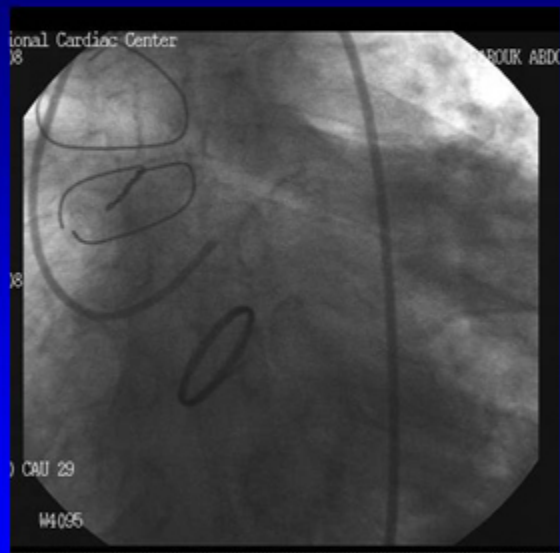
Stenting of proximal LAD



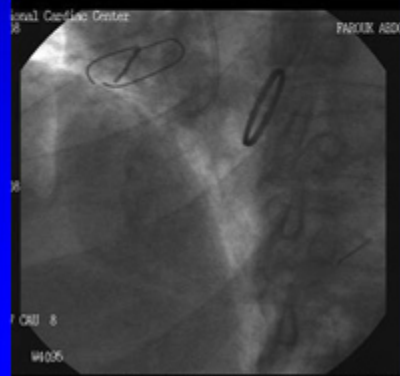
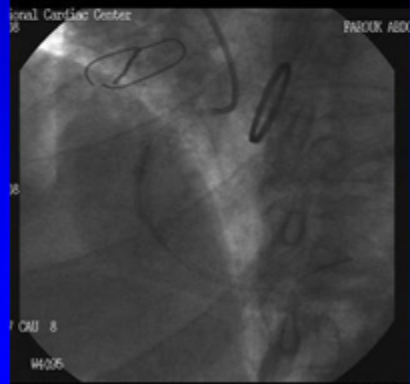
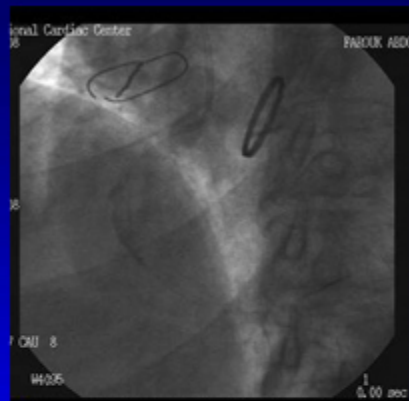
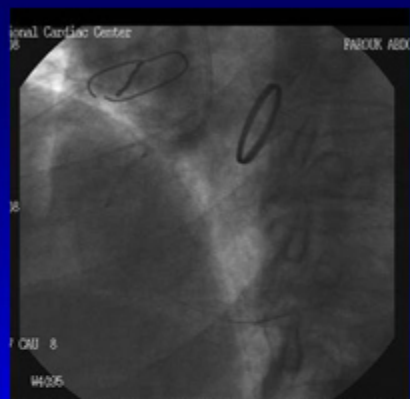
Kissing Balloon technique



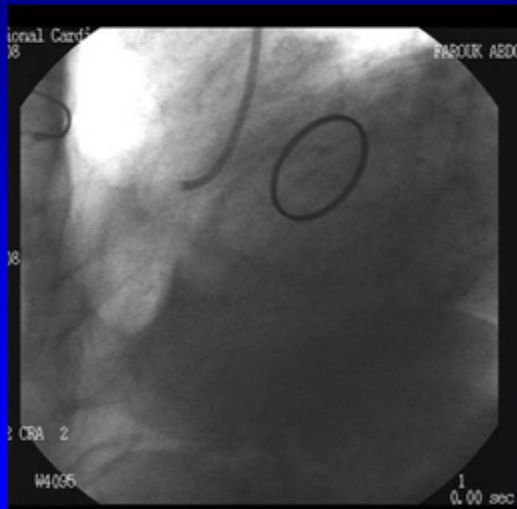
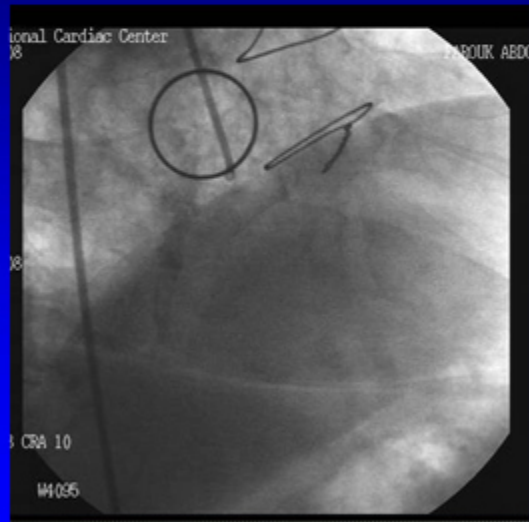
After Kissing



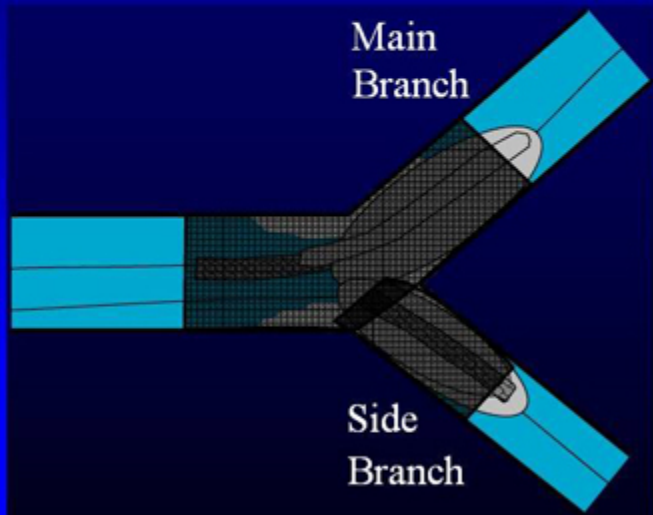
RCA stenting



After Stenting



The TAP Technique (T stent And Protrusion)



Wire both vessels

Pre-dilate as needed

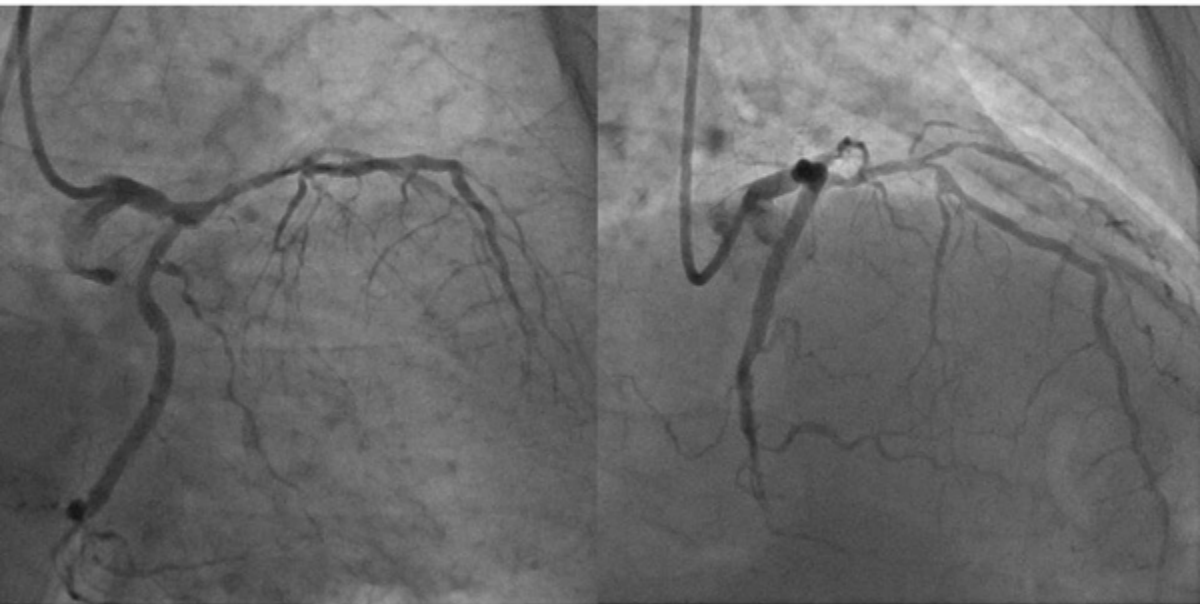
Position and deploy main
branch stent

Rewire side branch and
balloon dilate

Position side branch stent
so proximal edge
protrudes slightly into
main branch, 'backstop'
balloon in main branch

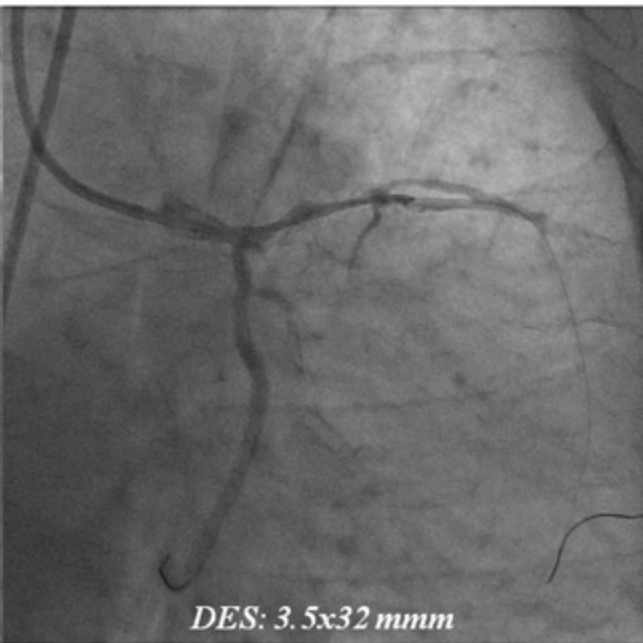
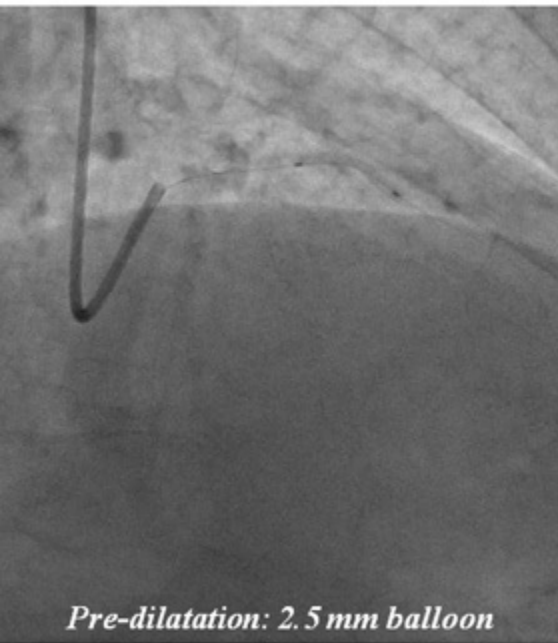
Deploy side branch stent
first, then inflate main
branch balloon to kiss

TAP technique

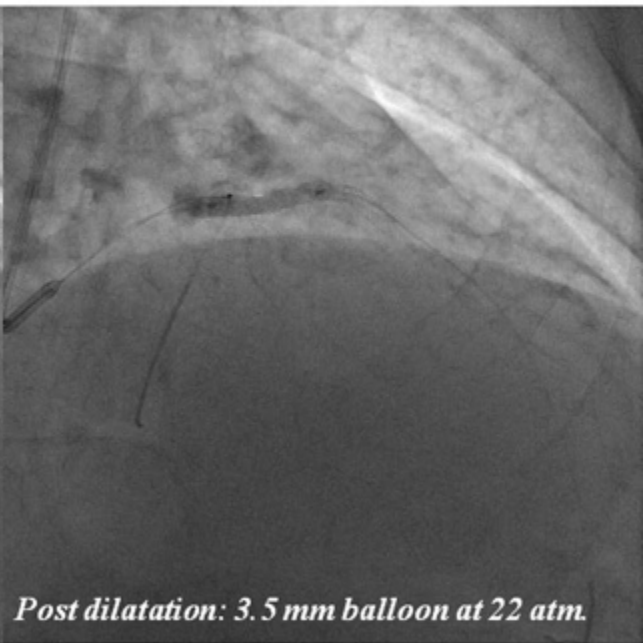
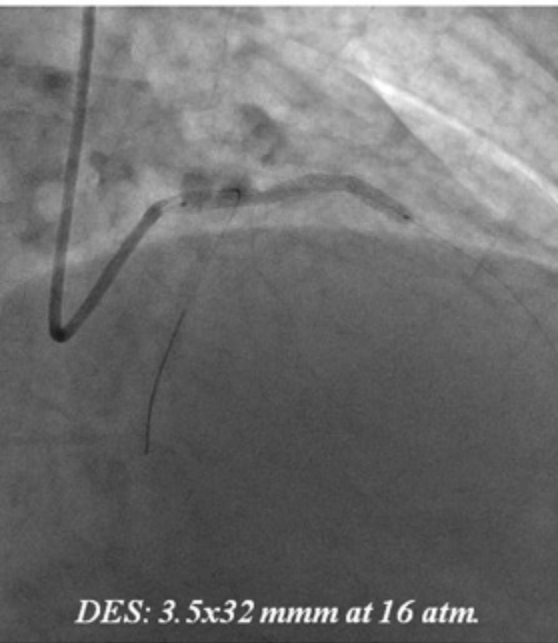


ICC, June 7th 2010

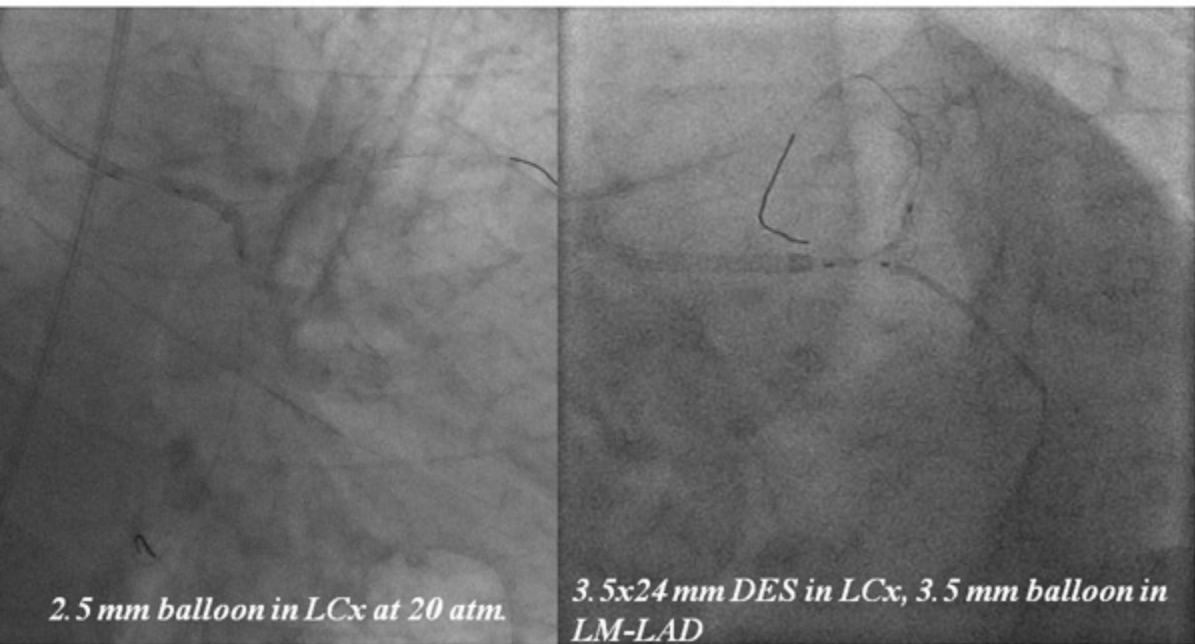
TAP technique



TAP technique



TAP technique



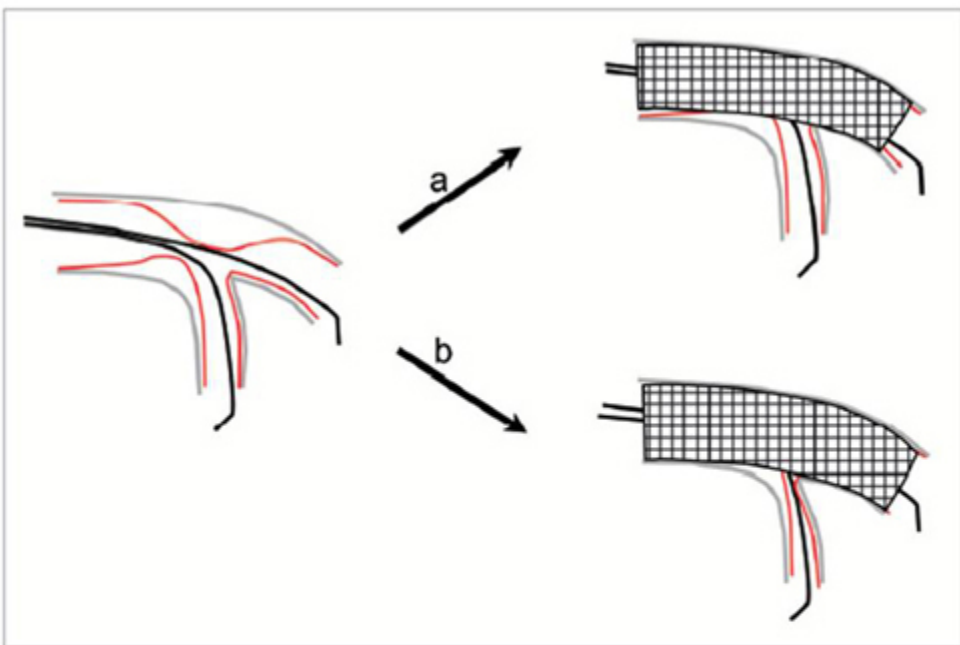
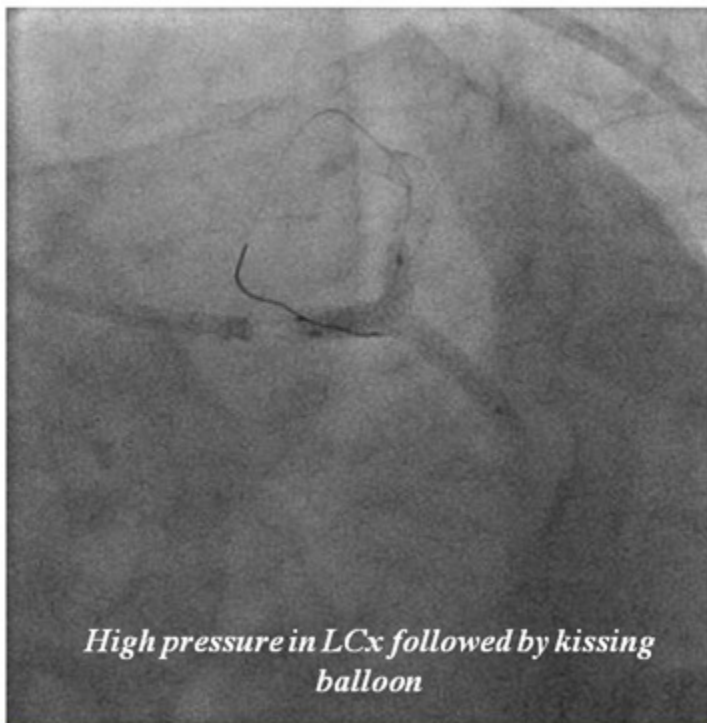


Figure 3. Illustration of 1,1,0 left main bifurcation lesion. Option a, stent diameter selected according to distal MB reference. No carina shifting, but stent not fully apposed in the proximal MB. Option b, stent diameter selected according to proximal MB reference diameter. Severe carina shifting, but stent fully apposed in the proximal MB.

TAP technique



**Patients with LMCA disease who
are good candidate for surgery**

Should be
Good Candidate for Stenting !

Revascularization for UPLMT

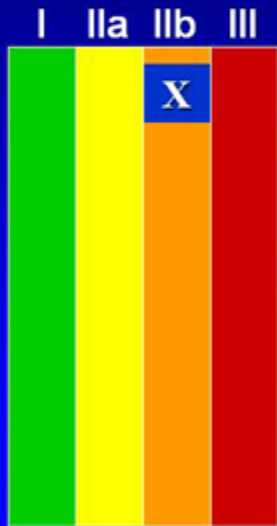
Current ACC/AHA/SCAI Guidelines



**Unprotected LMT and good
surgical candidate.
PCI will be contraindicated**

Revascularization for UPLMT

Current ACC/AHA/SCAI Guidelines



**Unprotected LMT in high risk
surgical candidate.
PCI could be indicated**