

LMCA ANGIOPLASTY

TCT AP 2012, SEOUL, S KOREA

DR BINOY JOHN

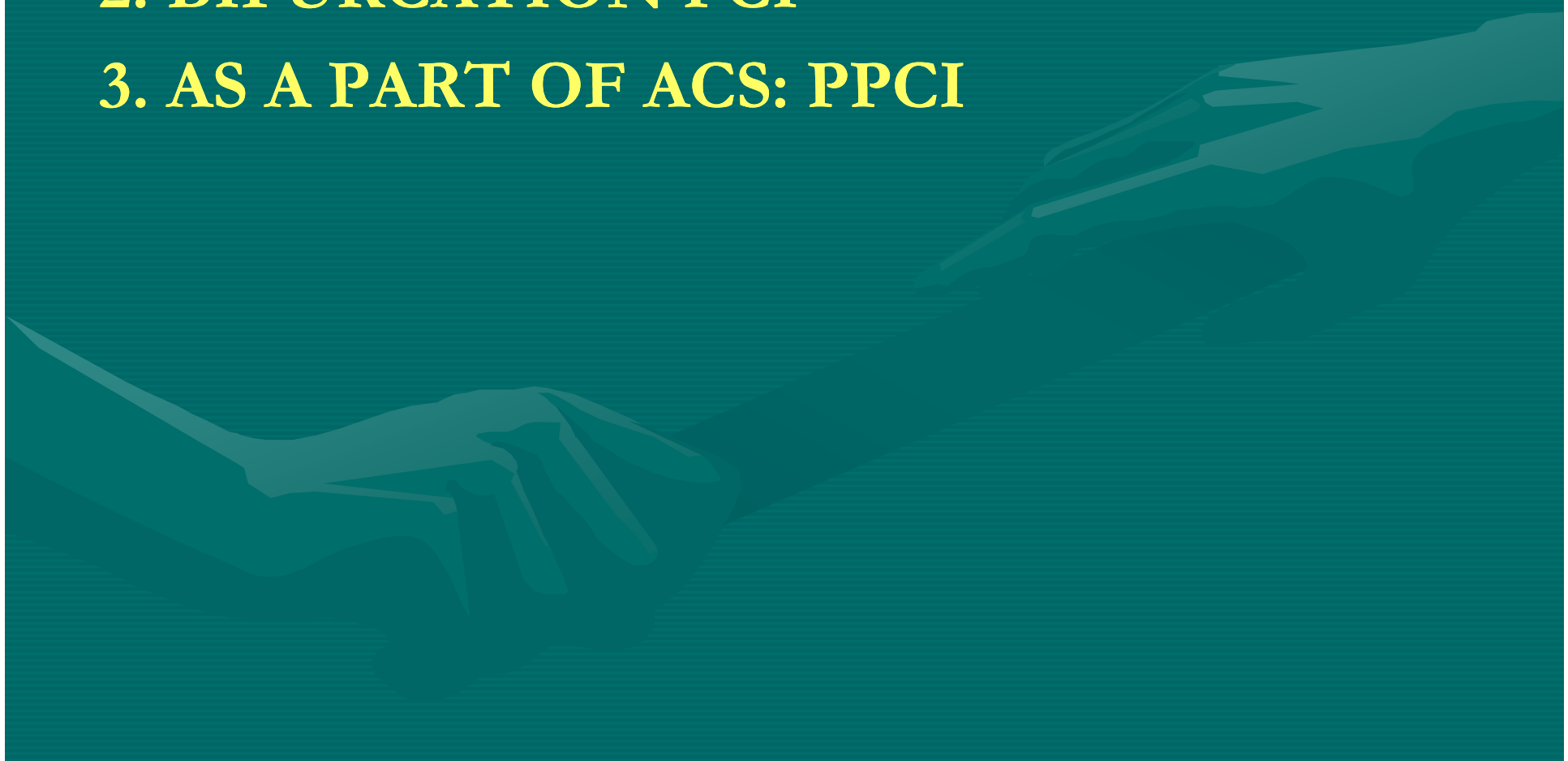
**SENIOR CONSULTANT INTERVENTIONAL CARDIOLOGIST
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- **LMCA STENOSES: 5 – 7 % OF ALL CAGs.**
- **LMCA STENOSES:**
 1. OSTIUM
 2. SHAFT
 3. BIFURCATION/DISTAL SEGMENT

LMCA INTERVENTIONS:

- 1. OSTIAL AND SHAFT PCI**
- 2. BIFURCATION PCI**
- 3. AS A PART OF ACS: PPCI**



ACCF/AHA/SCAI TASK FORCE RECOMMENDATIONS FOR PCI 2011

Table 1. Applying Classification of Recommendations and Level of Evidence

		SIZE OF TREATMENT EFFECT												
		CLASS I <i>Benefit >>> Risk</i> Procedure/Treatment SHOULD be performed/administered	CLASS IIa <i>Benefit >> Risk</i> Additional studies with <i>focused objectives needed</i> IT IS REASONABLE to perform procedure/administer treatment	CLASS IIb <i>Benefit ≥ Risk</i> Additional studies with <i>broad objectives needed; additional registry data would be helpful</i> Procedure/Treatment MAY BE CONSIDERED	CLASS III <i>No Benefit</i> or CLASS III <i>Harm</i> <table border="1"> <tr> <td></td> <td>Procedure/ Test</td> <td>Treatment</td> </tr> <tr> <td>COR III: No benefit</td> <td>Not Helpful</td> <td>No Proven Benefit</td> </tr> <tr> <td>COR III: Harm</td> <td>Excess Cost w/o Benefit or Harmful</td> <td>Harmful to Patients</td> </tr> </table>		Procedure/ Test	Treatment	COR III: No benefit	Not Helpful	No Proven Benefit	COR III: Harm	Excess Cost w/o Benefit or Harmful	Harmful to Patients
	Procedure/ Test	Treatment												
COR III: No benefit	Not Helpful	No Proven Benefit												
COR III: Harm	Excess Cost w/o Benefit or Harmful	Harmful to Patients												
ESTIMATE OF CERTAINTY (PRECISION) OF TREATMENT EFFECT	LEVEL A Multiple populations evaluated* Data derived from multiple randomized clinical trials or meta-analyses	<ul style="list-style-type: none"> Recommendation that procedure or treatment is useful/effective Sufficient evidence from multiple randomized trials or meta-analyses 	<ul style="list-style-type: none"> Recommendation in favor of treatment or procedure being useful/effective Some conflicting evidence from multiple randomized trials or meta-analyses 	<ul style="list-style-type: none"> Recommendation's usefulness/efficacy less well established Greater conflicting evidence from multiple randomized trials or meta-analyses 	<ul style="list-style-type: none"> Recommendation that procedure or treatment is not useful/effective and may be harmful Sufficient evidence from multiple randomized trials or meta-analyses 									
	LEVEL B Limited populations evaluated* Data derived from a single randomized trial or nonrandomized studies	<ul style="list-style-type: none"> Recommendation that procedure or treatment is useful/effective Evidence from single randomized trial or nonrandomized studies 	<ul style="list-style-type: none"> Recommendation in favor of treatment or procedure being useful/effective Some conflicting evidence from single randomized trial or nonrandomized studies 	<ul style="list-style-type: none"> Recommendation's usefulness/efficacy less well established Greater conflicting evidence from single randomized trial or nonrandomized studies 	<ul style="list-style-type: none"> Recommendation that procedure or treatment is not useful/effective and may be harmful Evidence from single randomized trial or nonrandomized studies 									
	LEVEL C Very limited populations evaluated* Only consensus opinion of experts, case studies, or standard of care	<ul style="list-style-type: none"> Recommendation that procedure or treatment is useful/effective Only expert opinion, case studies, or standard of care 	<ul style="list-style-type: none"> Recommendation in favor of treatment or procedure being useful/effective Only diverging expert opinion, case studies, or standard of care 	<ul style="list-style-type: none"> Recommendation's usefulness/efficacy less well established Only diverging expert opinion, case studies, or standard of care 	<ul style="list-style-type: none"> Recommendation that procedure or treatment is not useful/effective and may be harmful Only expert opinion, case studies, or standard of care 									
Suggested phrases for writing recommendations		should is recommended is indicated is useful/effective/beneficial	is reasonable can be useful/effective/beneficial is probably recommended or indicated	may/might be considered may/might be reasonable usefulness/effectiveness is unknown/unclear/uncertain or not well established	COR III: No Benefit is not recommended is not indicated should not be performed/administered/ other is not useful/ beneficial/ effective	COR III: Harm potentially harmful causes harm associated with excess morbidity/mortality should not be performed/administered/ other								
Comparative effectiveness phrases [†]		treatment/strategy A is recommended/indicated in preference to treatment B treatment A should be chosen over treatment B	treatment/strategy A is probably recommended/indicated in preference to treatment B it is reasonable to choose treatment A over treatment B											

CABG IS A CLASS I RECOMMENDATION. BUT IN CERTAIN SITUATIONS LMCA PCI MAY BE UNDERTAKEN AS CLASS II_a AND II_b INDICATIONS

Table 2. Revascularization to Improve Survival Compared With Medical Therapy

Anatomic Setting	COR	LOE
UPLM or complex CAD		
CABG and PCI	I—Heart Team approach recommended	C
CABG and PCI	II _a —Calculation of STS and SYNTAX scores	B
UPLM*		
CABG	I	B
PCI	II _a —For SIHD when <i>both</i> of the following are present: <ul style="list-style-type: none"> • Anatomic conditions associated with a low risk of PCI procedural complications and a high likelihood of good long-term outcome (e.g., a low SYNTAX score of ≤ 22, ostial or trunk left main CAD) • Clinical characteristics that predict a significantly increased risk of adverse surgical outcomes (e.g., STS-predicted risk of operative mortality $\geq 5\%$) 	B
	II _a —For UA/NSTEMI if not a CABG candidate	B
	II _a —For STEMI when distal coronary flow is TIMI flow grade < 3 and PCI can be performed more rapidly and safely than CABG	C
	II _b —For SIHD when <i>both</i> of the following are present: <ul style="list-style-type: none"> • 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) • Clinical characteristics that predict an increased risk of adverse surgical outcomes (e.g., moderate-severe COPD, disability from prior stroke, or prior cardiac surgery; STS-predicted risk of operative mortality $> 2\%$) 	B
	III: Harm—For SIHD in patients (versus performing CABG) with unfavorable anatomy for PCI and who are good candidates for CABG	B

WHAT MAKES LMCA INTERVENTIONS SO COMPLEX AND DREADFUL?

1. THE HUGE AMOUNT OF **MUSCLE AT JEOPARDY**.
2. AND THE EVER LOOMING RISK OF **STENT THROMBOSIS** IN SPITE OF VERY GOOD ACUTE RESULTS.

LMCA INTERVENTIONS:

1. A PROVISIONAL STENTING TECHNIQUE AS A PART OF PLANNED **SINGLE STENT STRATEGY**

2. **PLANNED DOUBLE STENT STRATEGY**

1. **TAP**

2. **V STENTING**

3. **CRUSH**

4. **CULOTTE**

3. **INITIAL PROVISIONAL WITH**

CROSS OVER TO DOUBLE STENT STRATEGY

CASE I



A. OSTIAL AND SHAFT PCI:

1. SINGLE STENT STRATEGY



A. OSTIAL AND SHAFT LESIONS: CLASS II A RECOMMENDATION

Ila—For SHD when *both* of the following are present:

- Anatomic conditions associated with a low risk of PCI procedural complications and a high likelihood of good long-term outcome (e.g., a low SYNTAX score of ≤ 22 , ostial or trunk left main CAD)
- Clinical characteristics that predict a significantly increased risk of adverse surgical outcomes (e.g., STS-predicted risk of operative mortality $\geq 5\%$)

B



ADVANTAGE:

- 1. LONG TERM OUTCOME IS AS GOOD AS CABG**

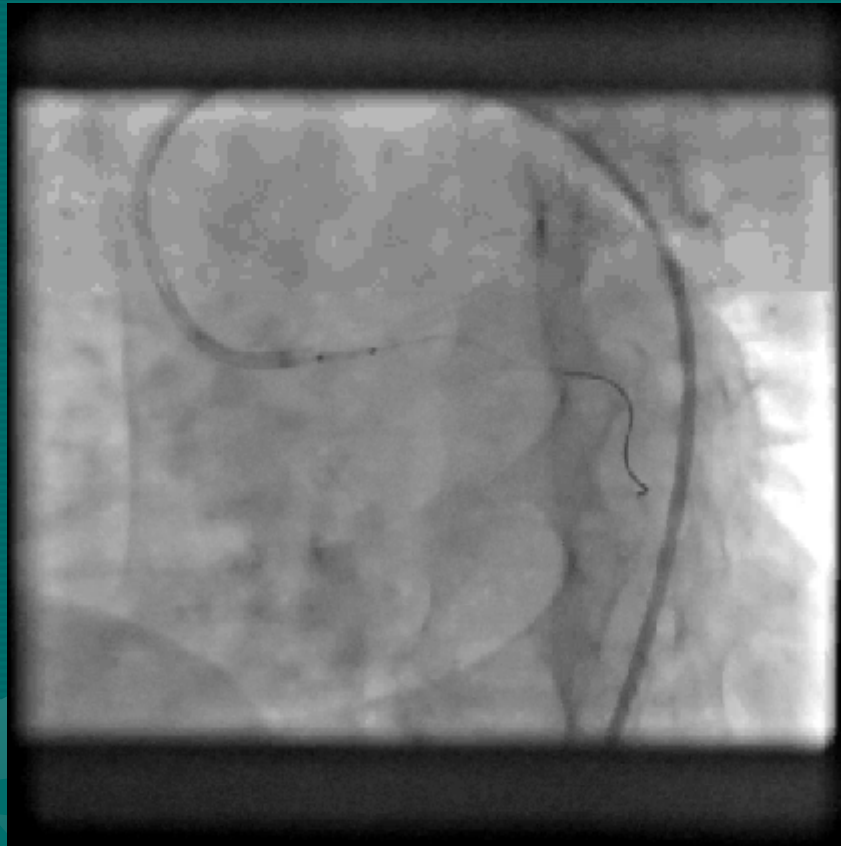
CAUTION:

- 1. USUALLY SHORT SEGMENT**
- 2. HENCE REQUIRES SHORT STENTS**
- 3. SO, CORRECT OSTIAL PLACEMENT IS DEMANDING AND CARE TO BE TAKEN TO AVOID OSTIAL MISS, DUE TO MOVEMENT**
- 4. STENT NOT DEPLOYED IN THE GUIDING**
- 4. NOT HAVE TOO MUCH OF STENT OUT**
- 5. AORTO OSTIAL DISSECTION**

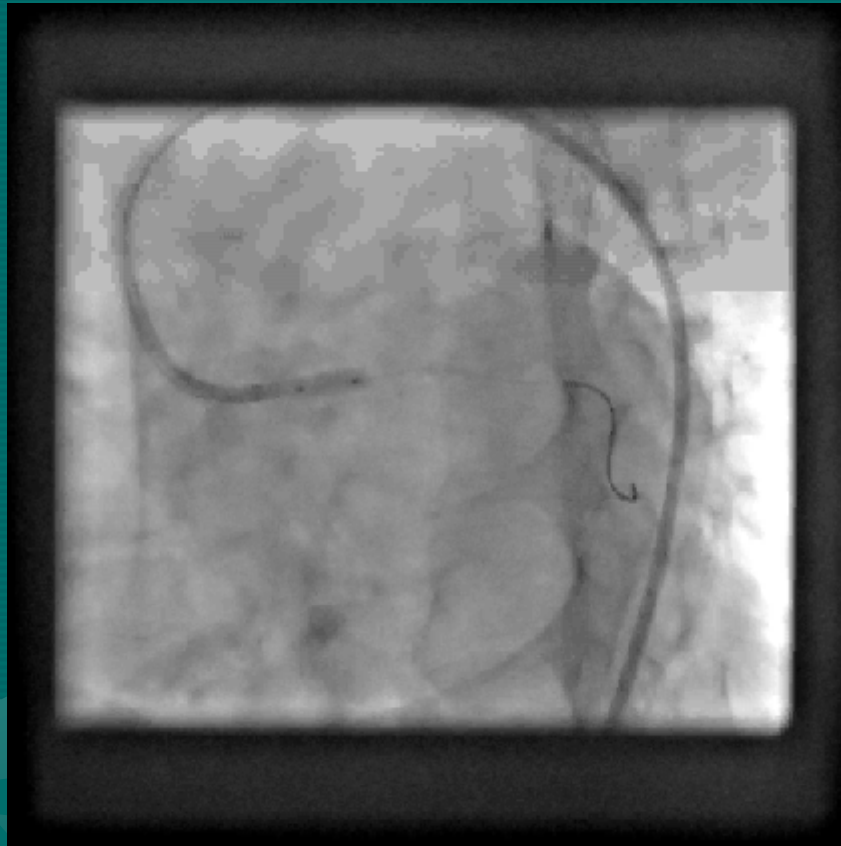
OSTIAL LMCA STENOSIS



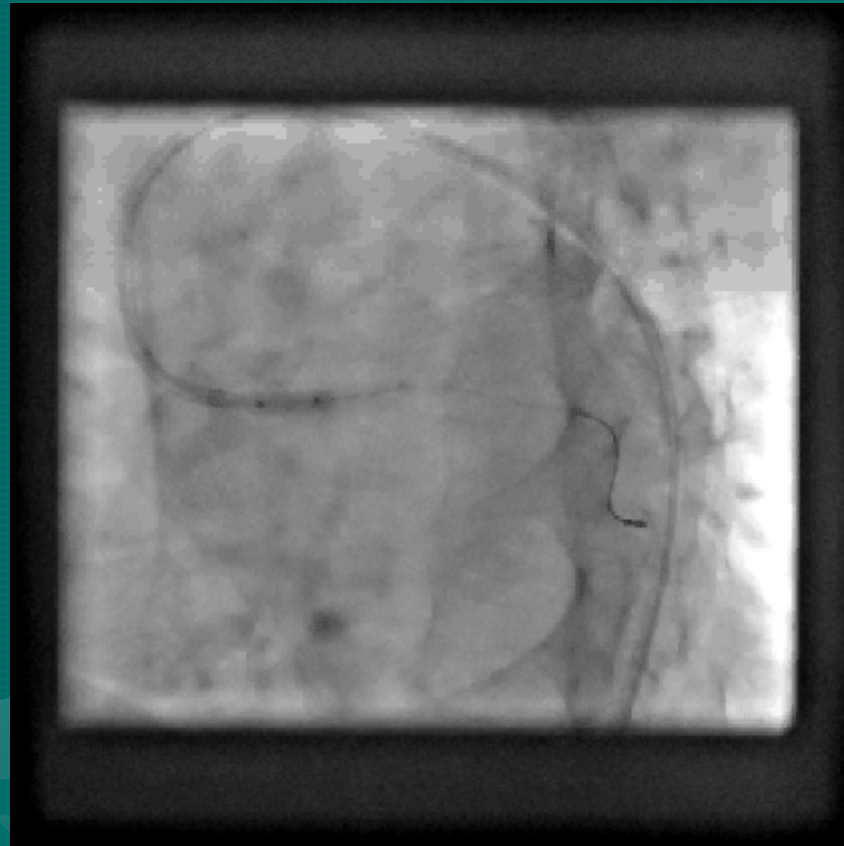
OST-LM-BALLOON DILATATION



OSTIAL STENT DEPLOYMENT



OSTIAL STENT FLARE



OST LM: POST STENT FINAL RESULT



CASE II



PPCI:

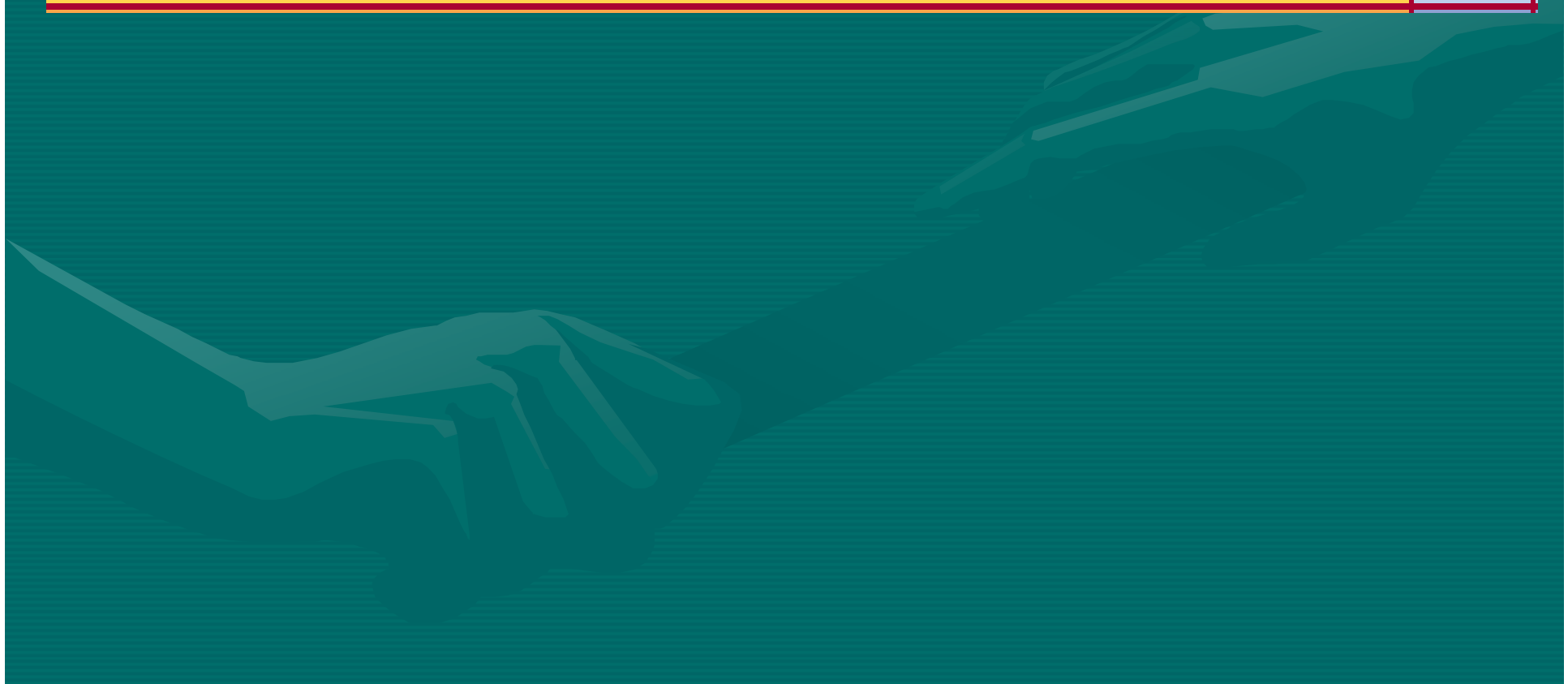
**AS A PART OF PROVISIONAL SINGLE
STENTING STRATEGY**



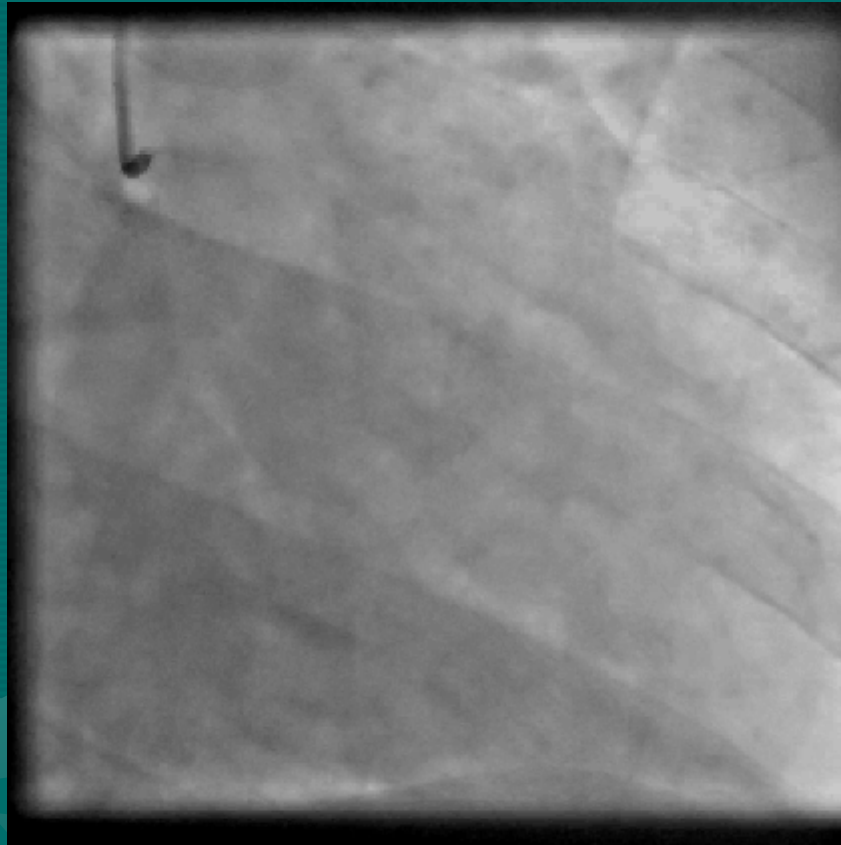
PPCI: CLASS II A RECOMMENDATION

Ila—For STEMI when distal coronary flow is TIMI flow grade ≤ 3 and PCI can be performed more rapidly and safely than CABG

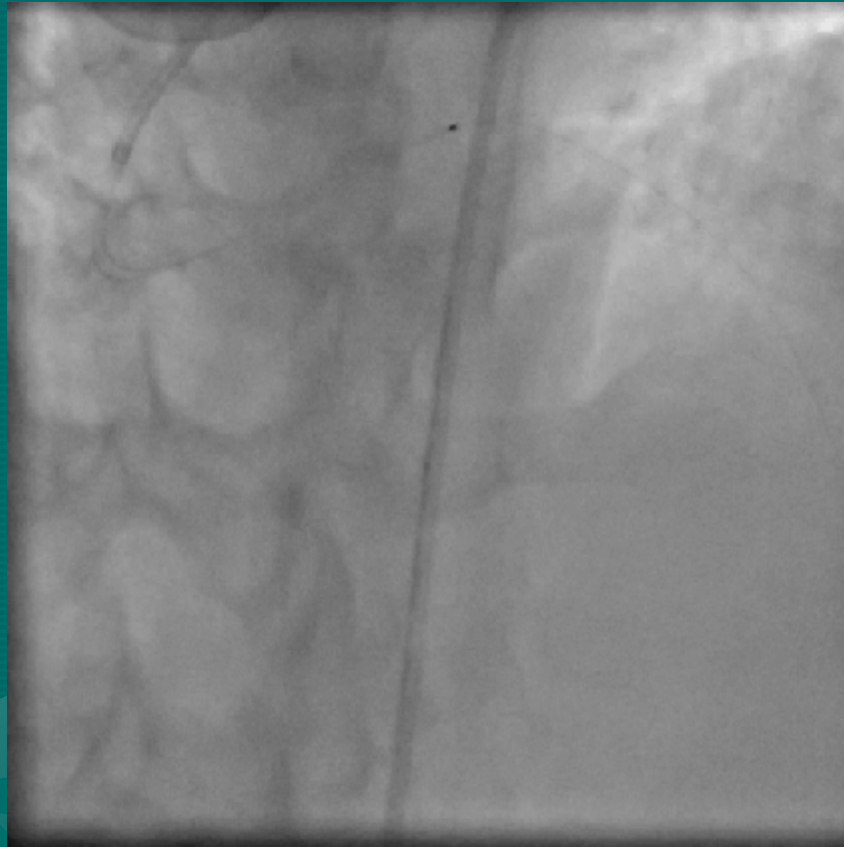
C



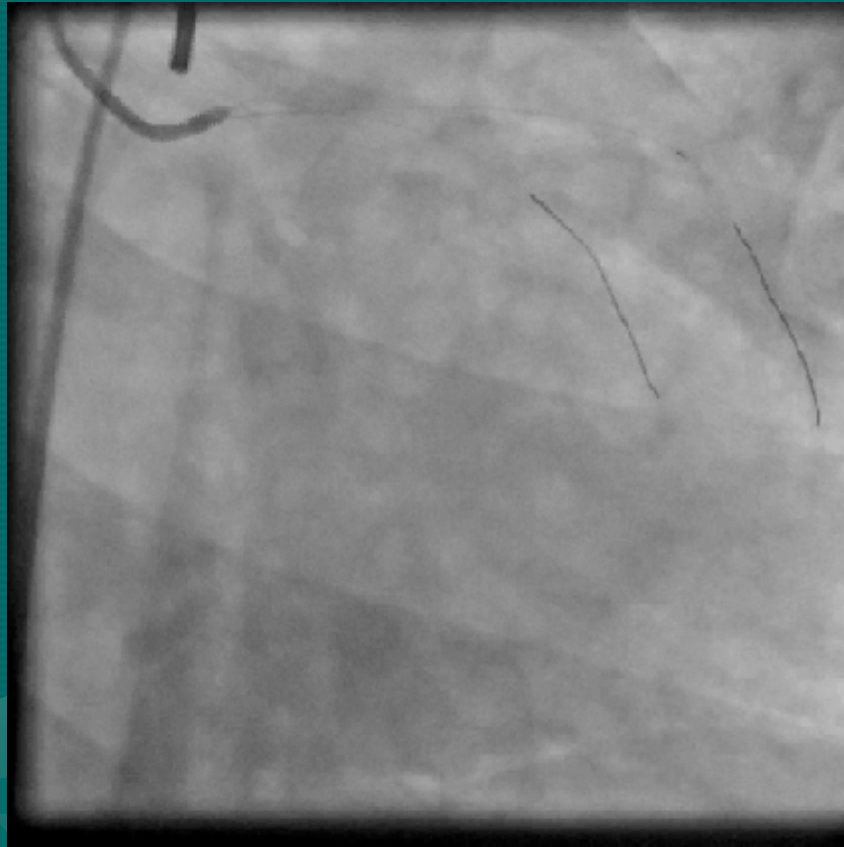
FLUSH TOTAL THROMBOTIC OCCLUSION AT DISTAL LMCA



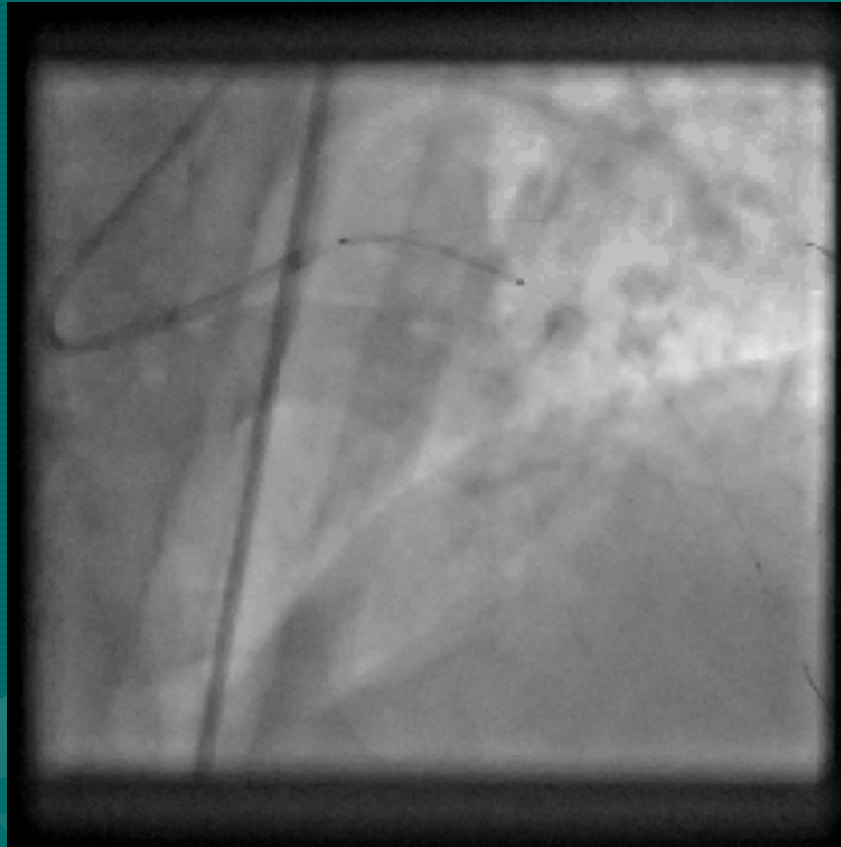
LAD AND LCX WIRED + THROMBUS SUCTION



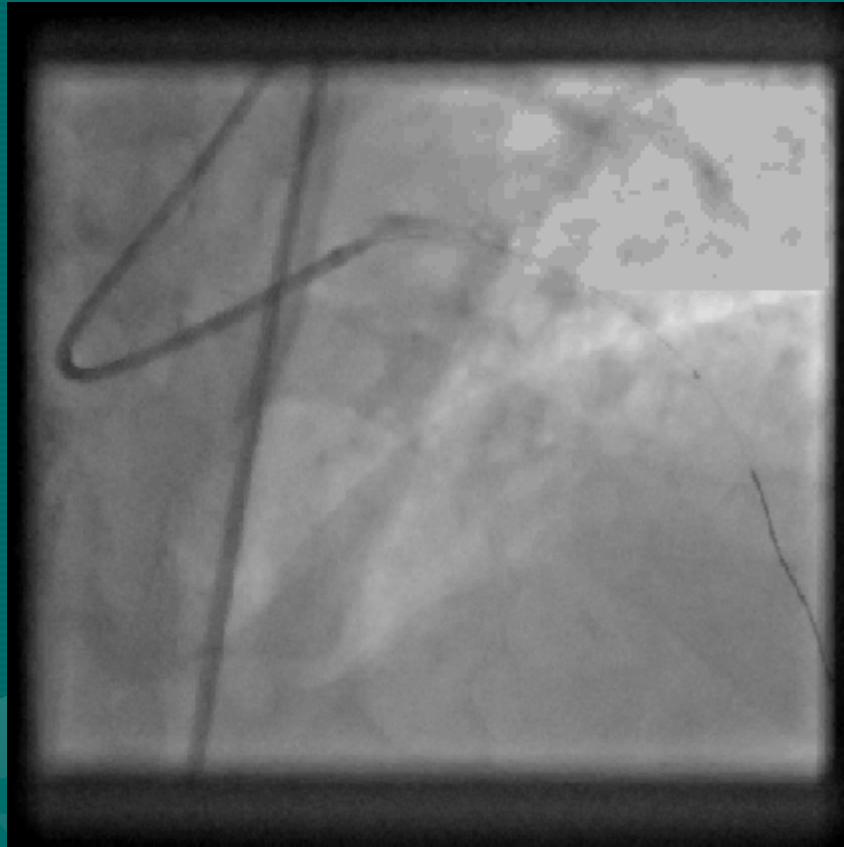
IABP PLACED IN SITU



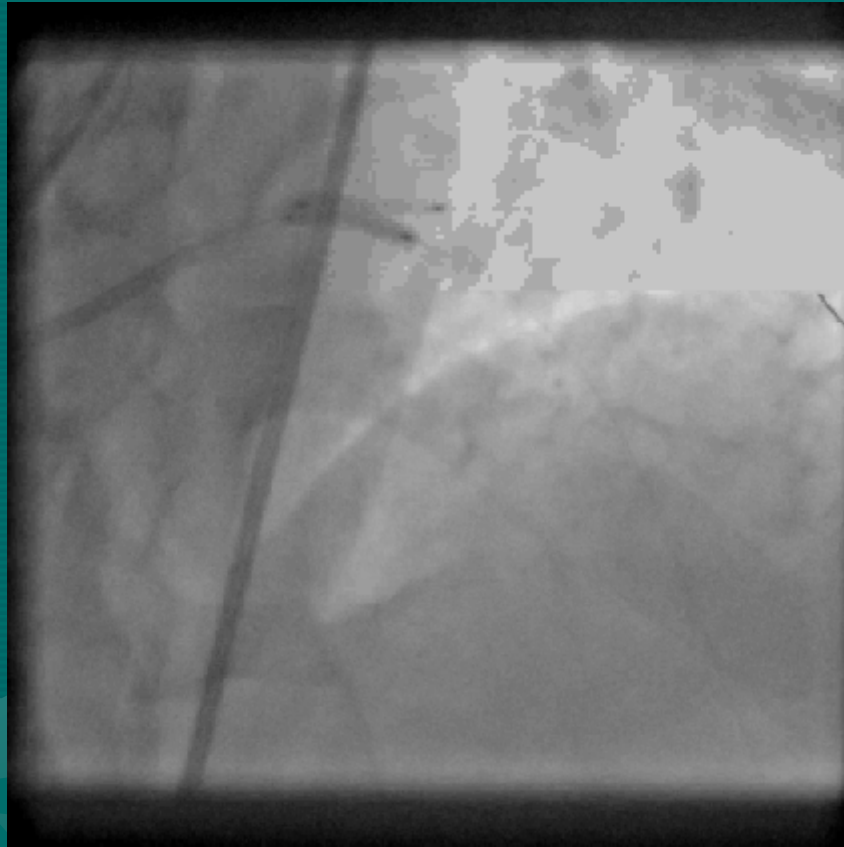
LMCA-LAD STENT AS PROV STENT STRATEGY



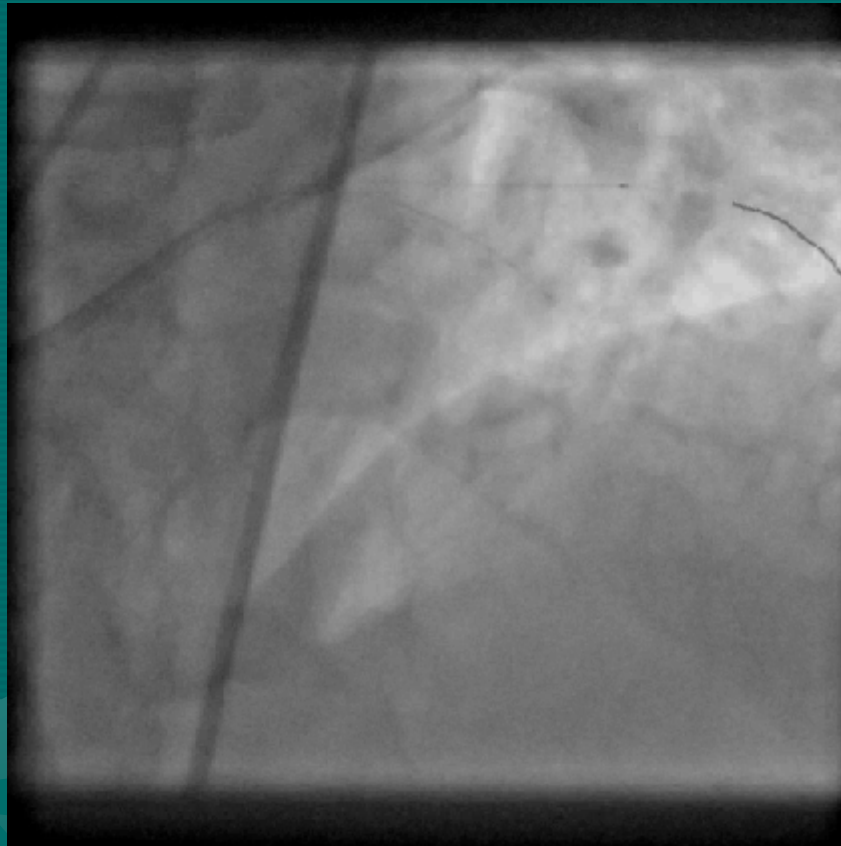
STENT DEPLOYED



LCX RECROSSED AND FKB DONE



**WITH TIMI 3 FLOW ESTABLISHED IN BOTH LAD
AND LCX**



B. BIFURCATION LESIONS ARE A CLASS II b RECOMMENDATION FOR PCI

IIb—For SHD when both of the following are present:

- 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)
- Clinical characteristics that predict an increased risk of adverse surgical outcomes (e.g., moderate-severe COPD, disability from prior stroke, or prior cardiac surgery; STS-predicted risk of operative mortality >2%)

B



B. BIFURCATION PCI

1. PROVISIONAL STENTING AS A PART OF SINGLE STENT STRATEGY

2. TWO STENT TECHNIQUE

1. TAP

2. V STENTING

3. CRUSH

4. CULOTTE

CASE III



V STENTING TECHNIQUE



**1. LMCA IS LARGE ENOUGH TO ACCOMMODATE
2 STENTS**

**2. LOCALIZED DISEASE IN DISTAL LMCA AND
DOES NOT EXTEND TO PROX LMCA**

3. ANGLE < 60 DEG

ADVANTAGE:

1. IMMEDIATE PATENCY OF BOTH BRANCHES
2. AVOID RECROSSING WIRE THROUGH STENT STRUTS

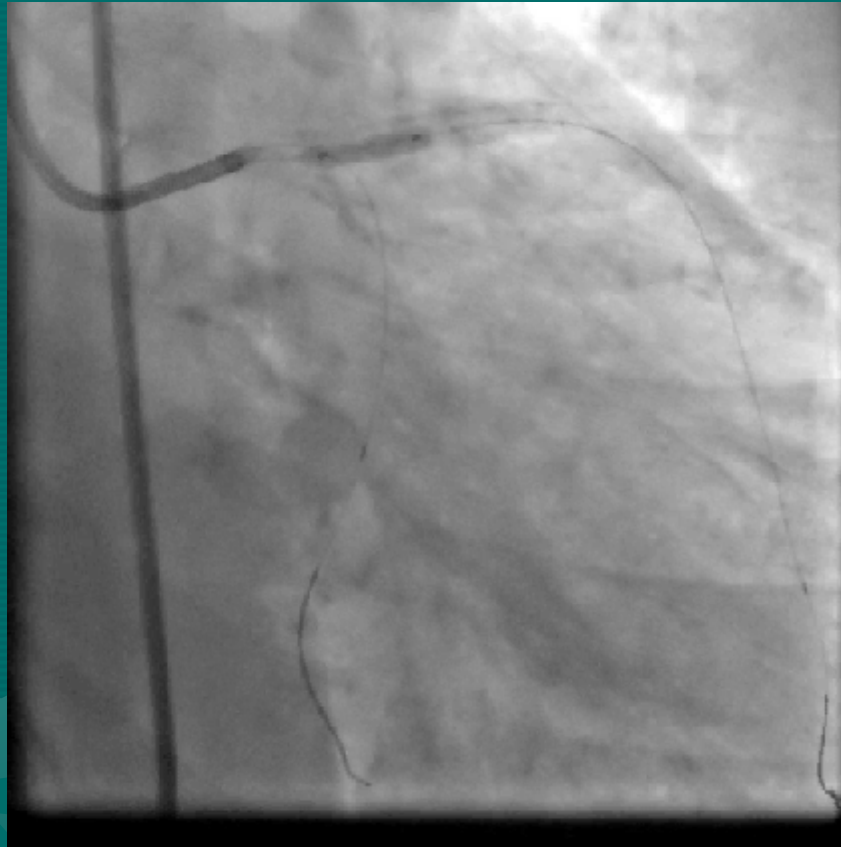
DOWN SIDE:

1. 2 LAYERS OF METAL IN THE MID SEGMENT AT THE SITE OF THE NEO CARINA, WITH HIGH PROBABILITY OF DELAYED ENDOTHELIALIZATION.
2. AND THEREFORE HIGH RISK OF **STENT THROMBOSIS AND RE STENOSIS.**
3. ALSO IF A **DISSECTION OCCURS IN THE PROXIMAL LMCA**, PLACING A STENT THERE WOULD LEAVE A GAP AND A BIAS TOWARDS ONE OF THE STENTS WITH HIGH RISK OF RE STENOSIS AND ST.
4. DUE TO THE PRESENCE OF A DOUBLE BARREL, **RE ACCESSING DISTALLY** IN CASE OF A FUTURE INTERVENTION WOULD BE DIFFICULT.
5. THERE IS ALSO THE DESCRIPTION OF A **MEMBRANE FORMATION AT THE NEO CARINA** WHICH APPEARS AS A FILLING DEFECT OF UNKNOWN LONG TERM PROGNOSIS.

V:DIAGNOSTIC: MEDINA 1,1,1



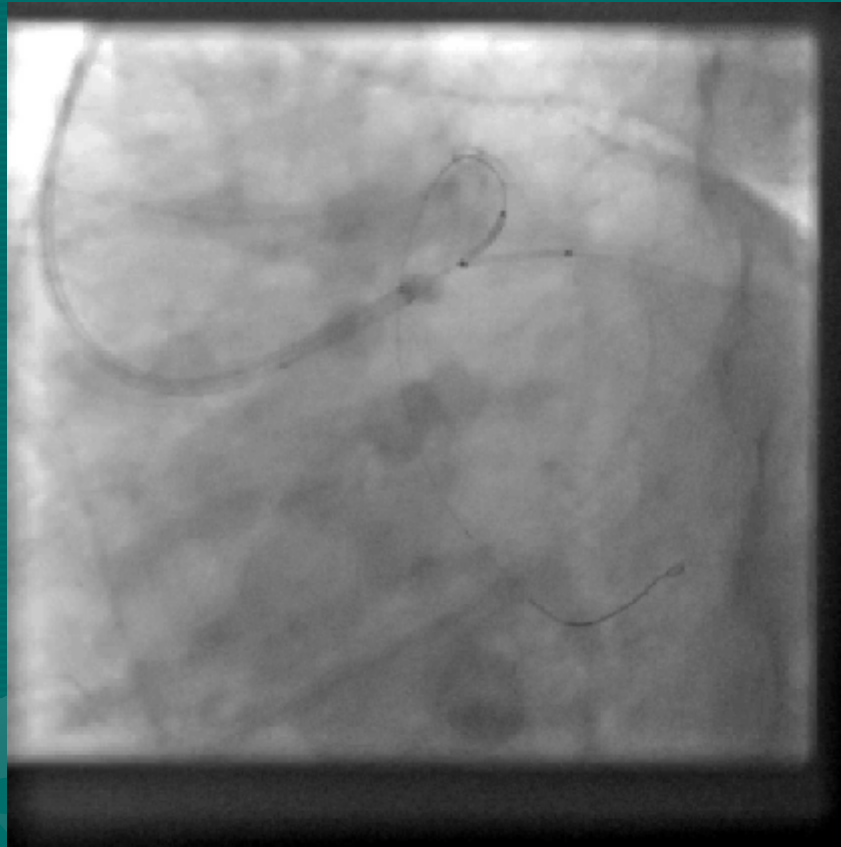
WIRE BOTH BRANCHES;PRE DILATE



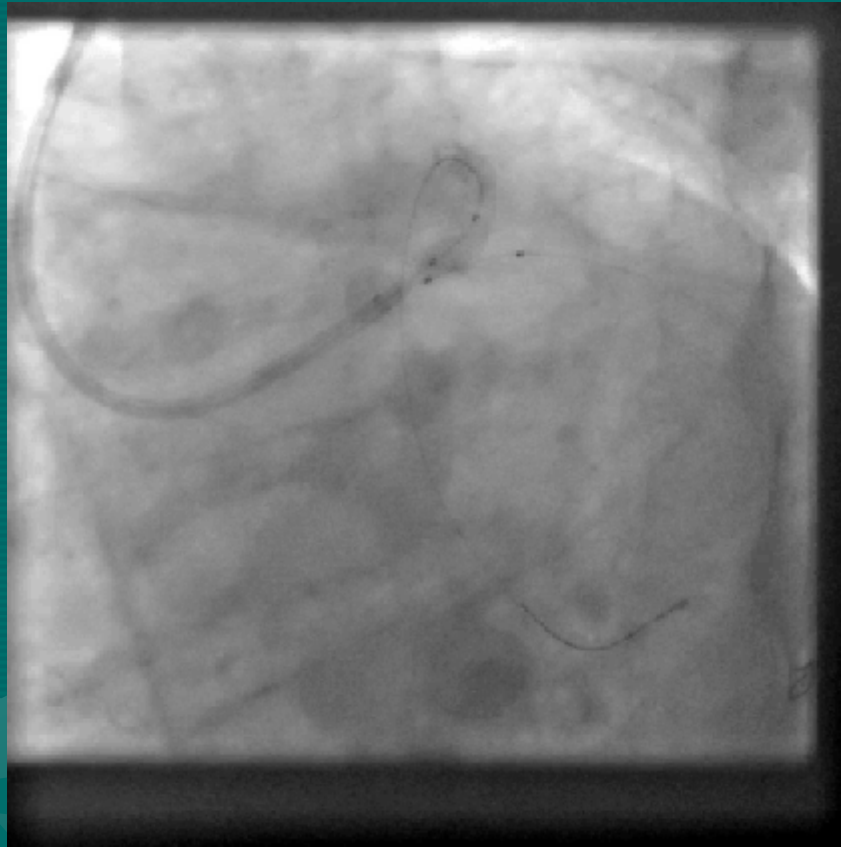
PRE DIL LCX



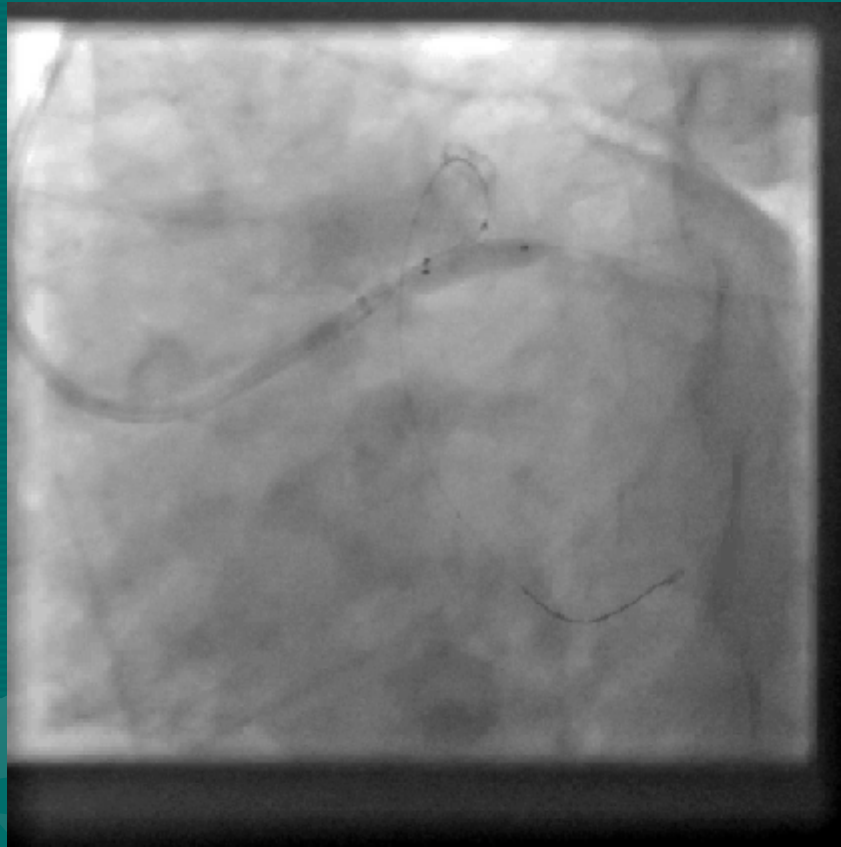
STENT POSITIONING



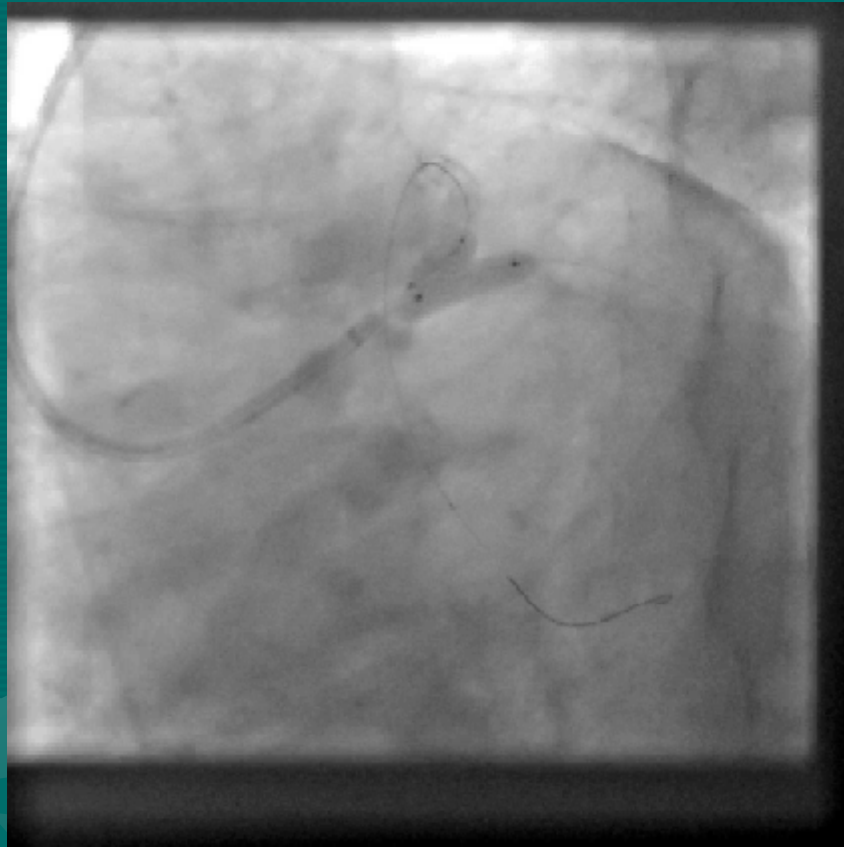
DEPLOYMENT



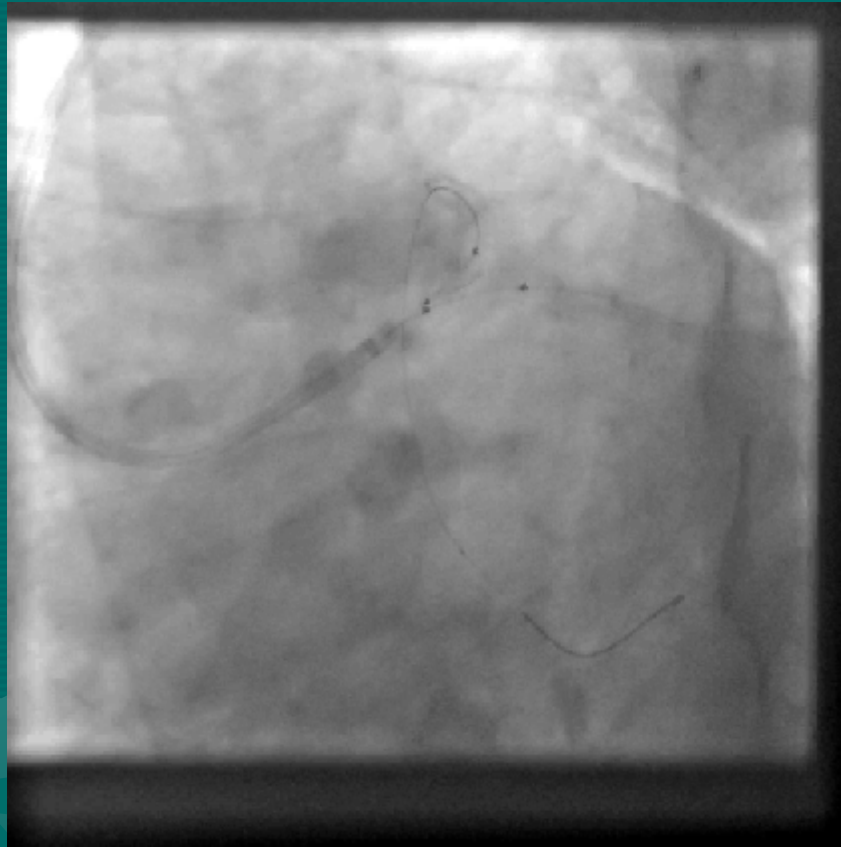
DEPLOYMENT



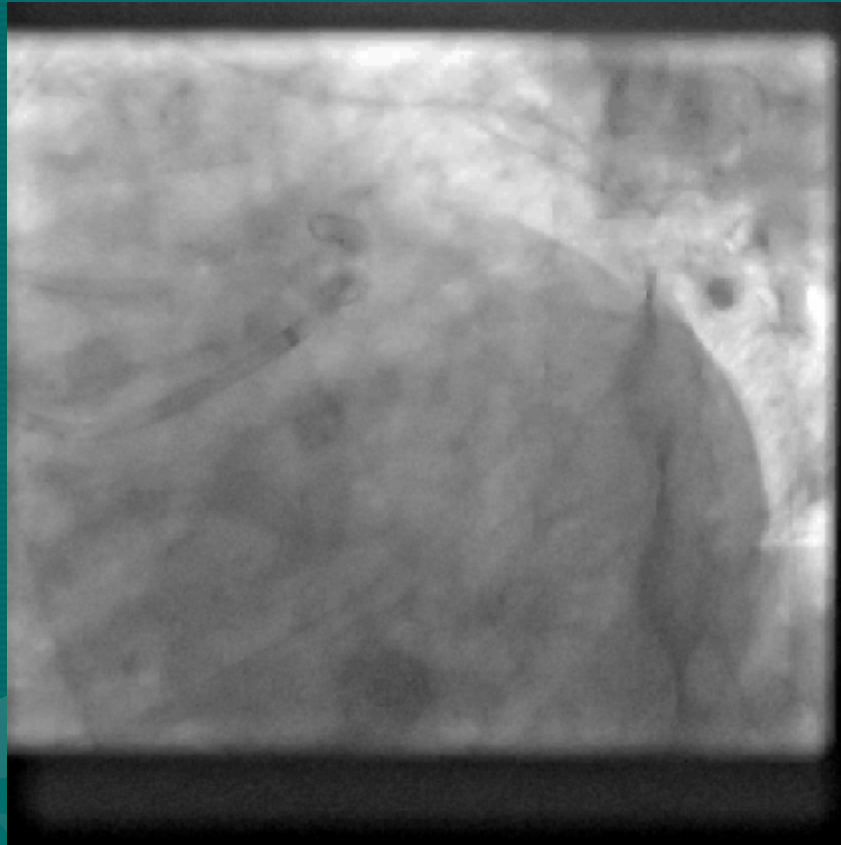
FINAL KB



POST DIL CHECK SHOT



FINAL RESULT



CASE IV



CRUSH TECHNIQUE



**1. WHEN LMCA IS NOT LARGE ENOUGH TO
ACCOMMODATE 2 STENTS.**

2. ANGLE < 60 DEG



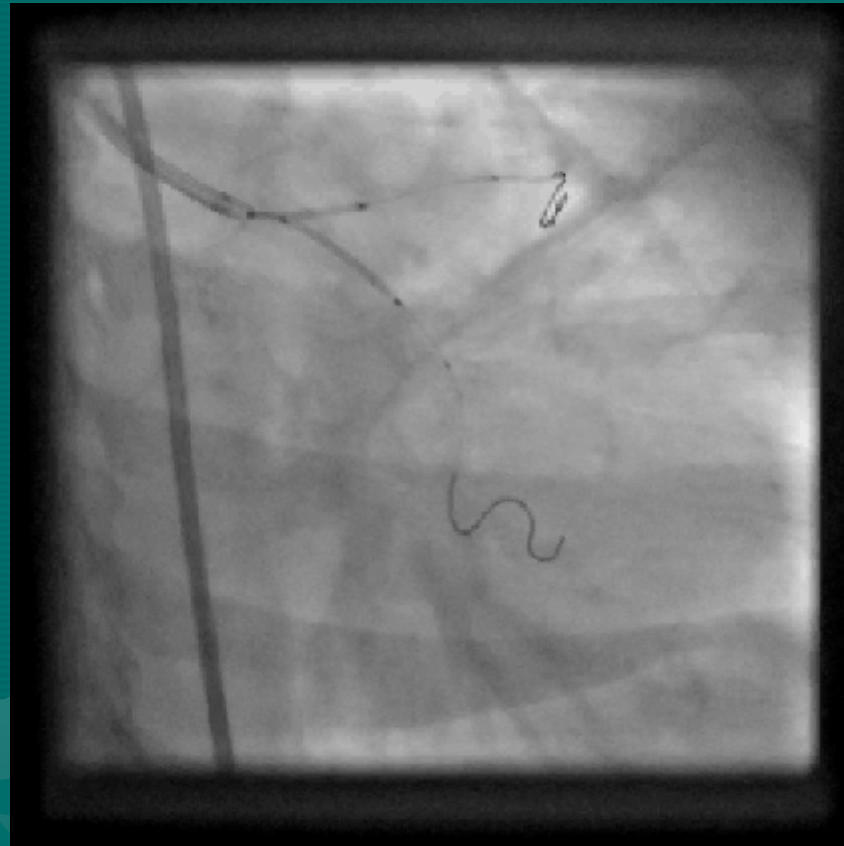
ADVANTAGE:

- 1. FULL COVERAGE OF SB OSTIUM**
- 2. LOWER RESTENOSIS COMPARED TO T**

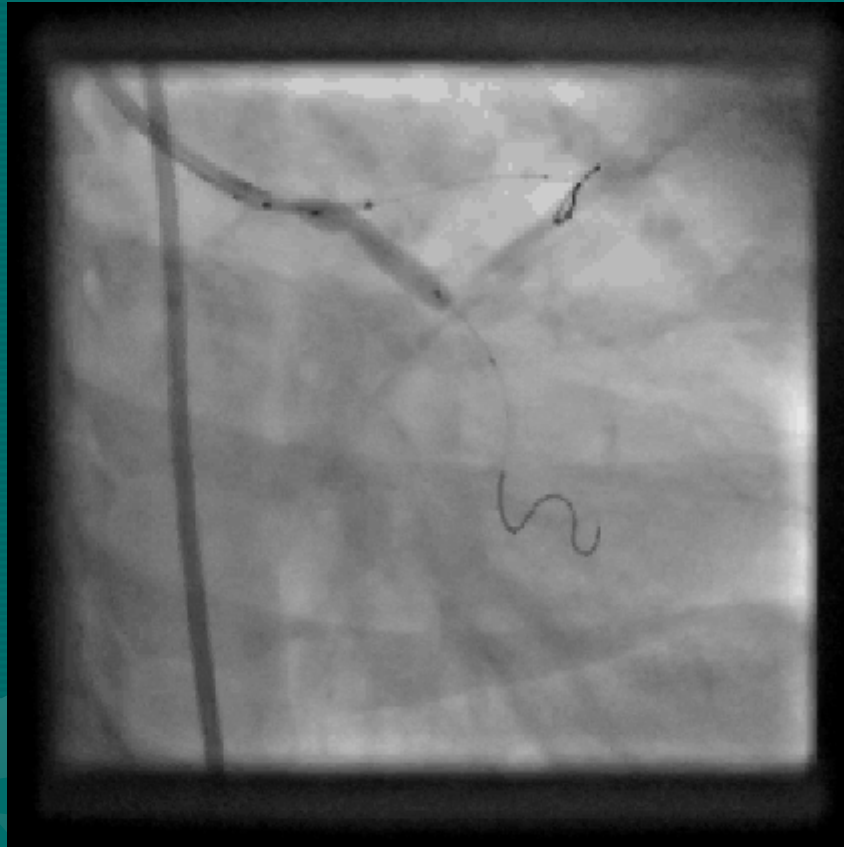
DOWN SIDE:

- 1. CUMBERSOME**
- 2. THREE LAYERS OF METAL IN LMCA.**
- 3. HENCE HIGHER RISK OF ST AND RE-STENOSIS**
- 4. DIFFICULTY WITH RE CROSSING STENT STRUTS INTO SB, OF WIRE, BALLOON AND STENT**

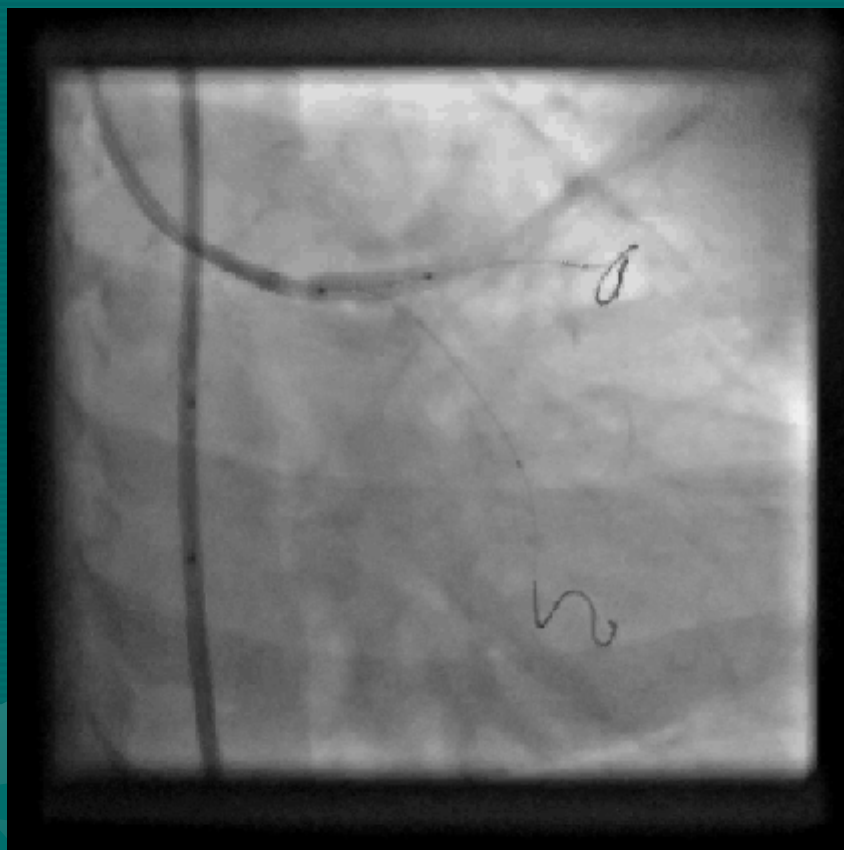
WIRE BOTH BRANCHES, PREDILATE AND POSITION STENTS



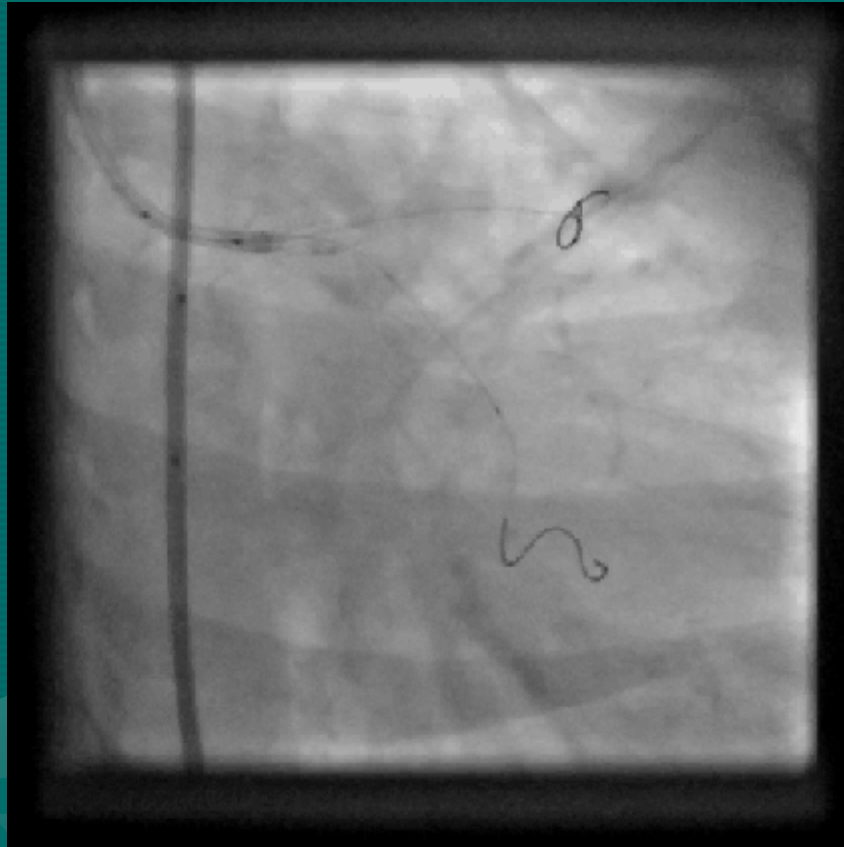
LMCA-LCX DEPLOYED



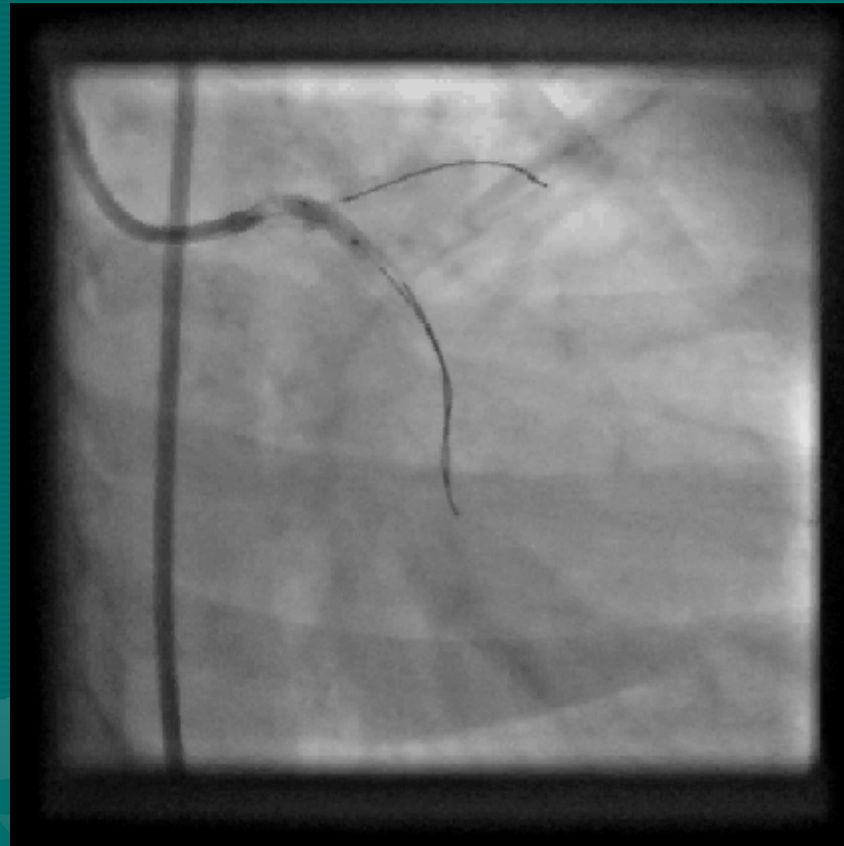
LAD DEPLOYED TO CRUSH LCX STENT



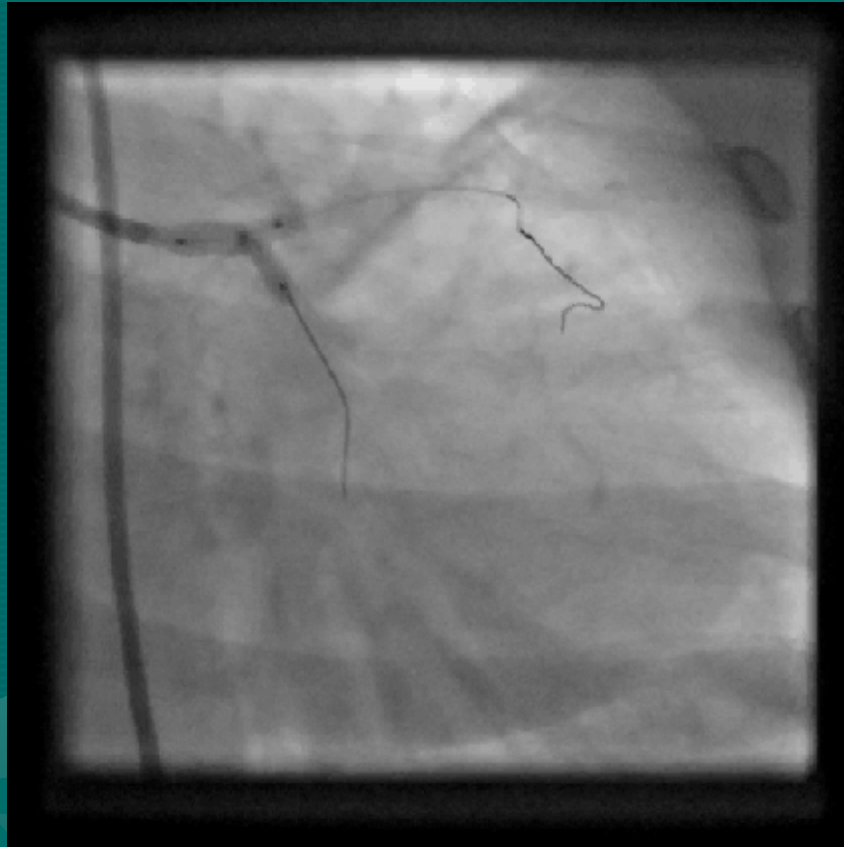
CHECK SHOT DONE



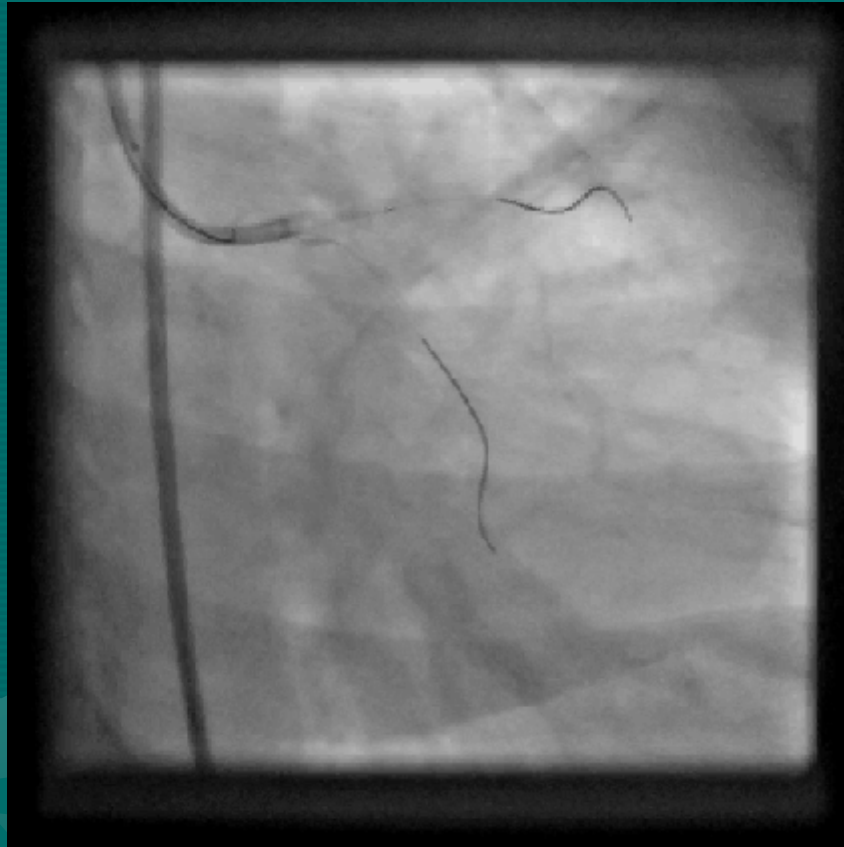
**LCX RECROSSED WITH WIRE AND BALLOON AND
DILATED**



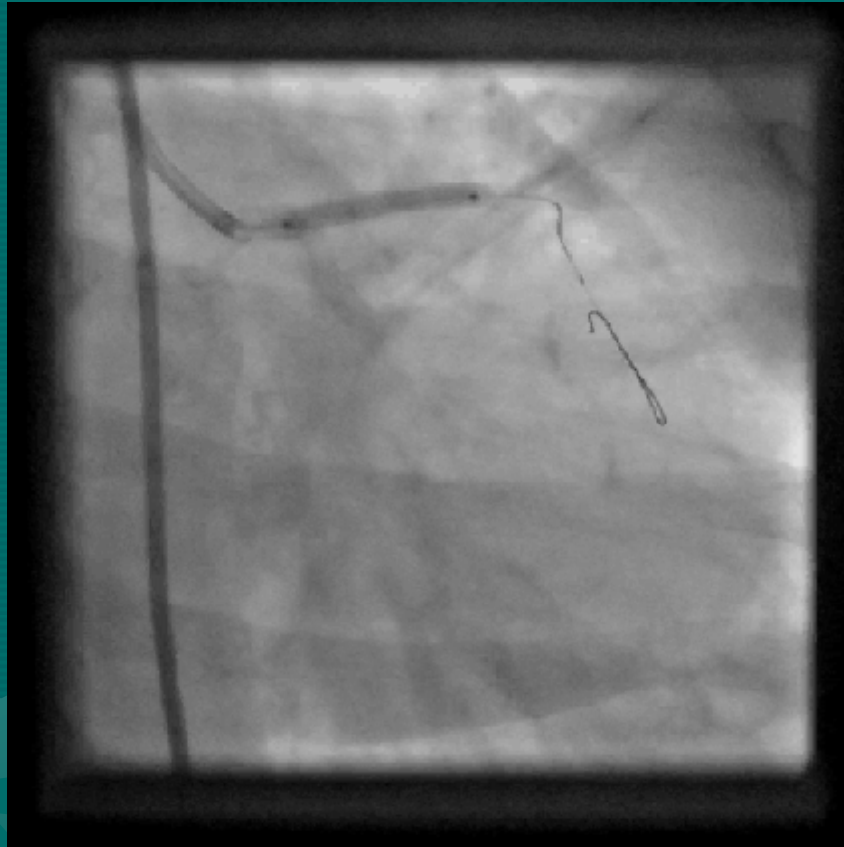
FINAL KB



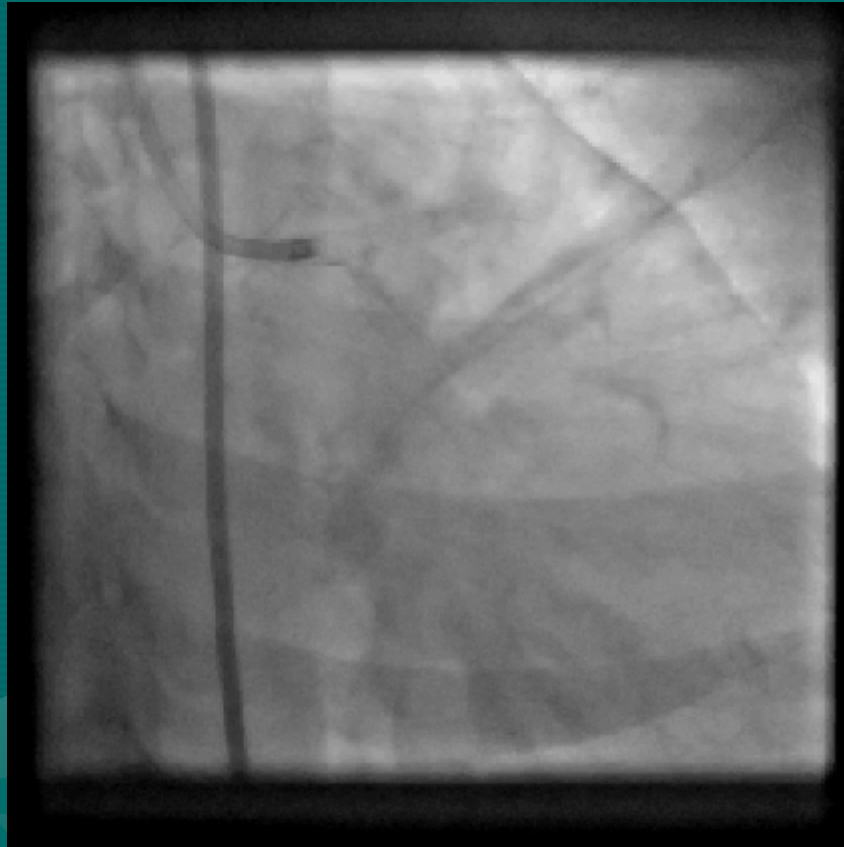
DISTAL STENT DISSECTION OF LAD



STENT IN LAD FOR DISSECTION



FINAL RESULT OF CRUSH



OTHER ISSUES

1. DEBULKING: WITH ROTA, ANGIOSCUPT OR CUTTING BALLOON: CALCIFIED AND FIBROTIC LESIONS

2. IABP: NOT FOR ALL CASES

BUT FOR:

1. SEVERE LV DYSFUNCTION

2. HYPOTENSION

3. ASSOCIATED RCA CTO

3. IVUS: MANDATORY:

MAIN COMPARE SUB STUDY.

3 YEAR MORTALITY BENEFIT:

IVUS GUIDED: 4.7% Vs CONVENTIONAL ANGIOGUIDED PCI: 16%

4. DAPT:

ADVANCEMENTS IN TECHNOLOGY:

- 1. DEDICATED BIFURCATION STENTS**
- 2. BIO VASCULAR SCAFFOLD**
- 3. NEWER AP DRUGS**