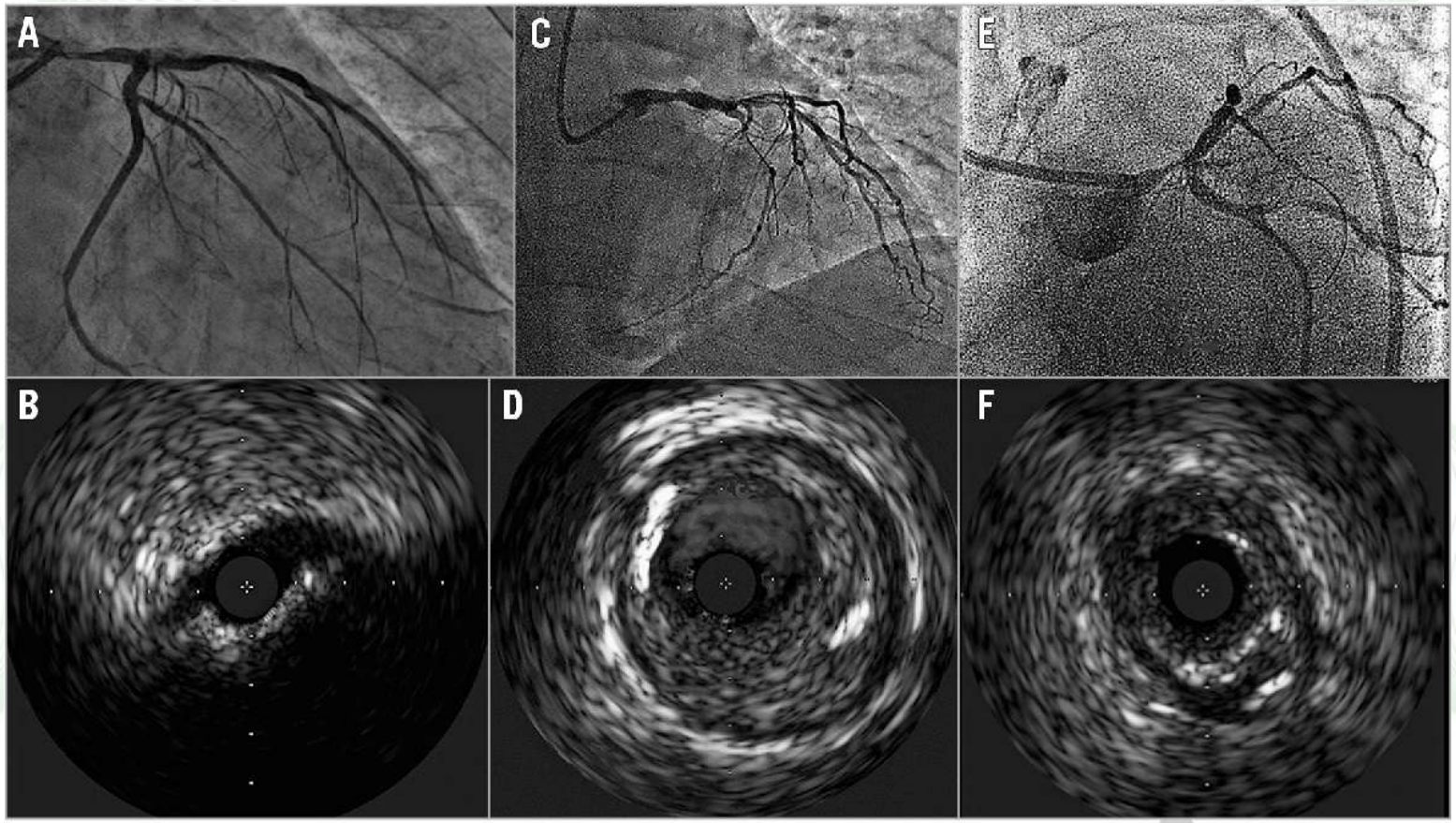
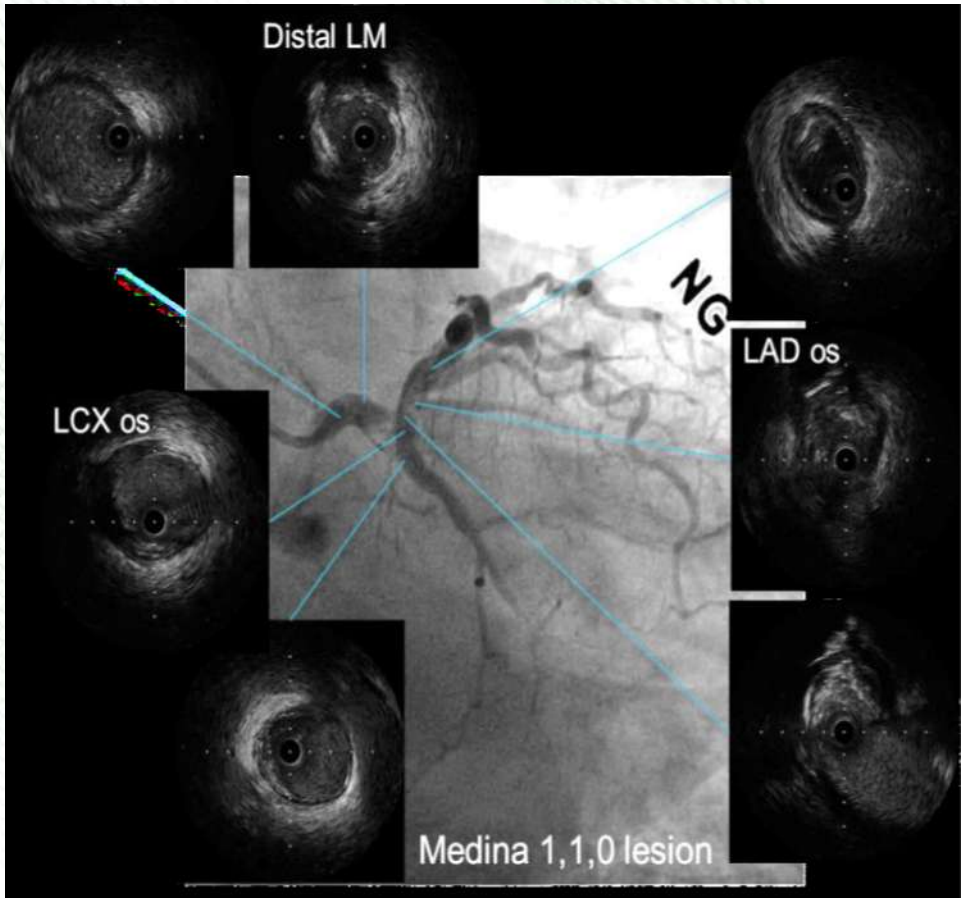
LEFT MAIN BIFURCATIONAL STENT STRATEGY: Provisional or upfront two stent strategy ?

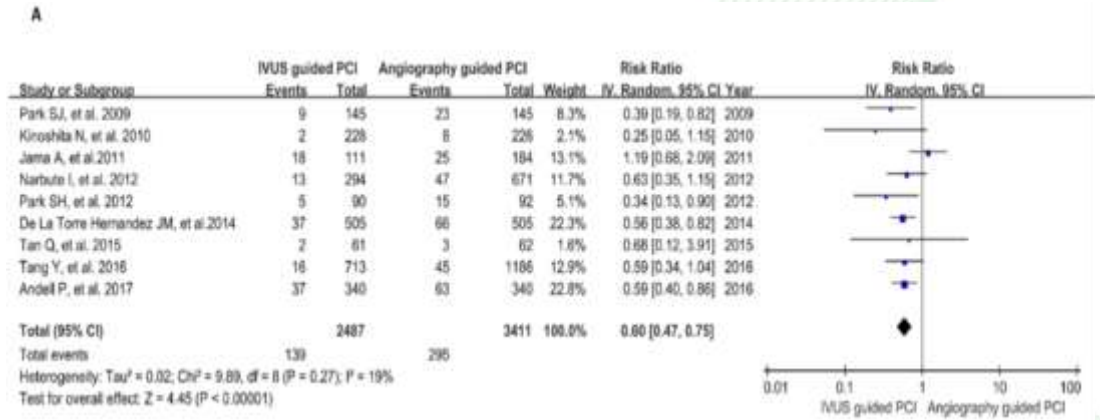
Dr.Mulayim Musayeva
MEDILAND HOSPITAL
SCIENTIFIC SURGICAL CENTER

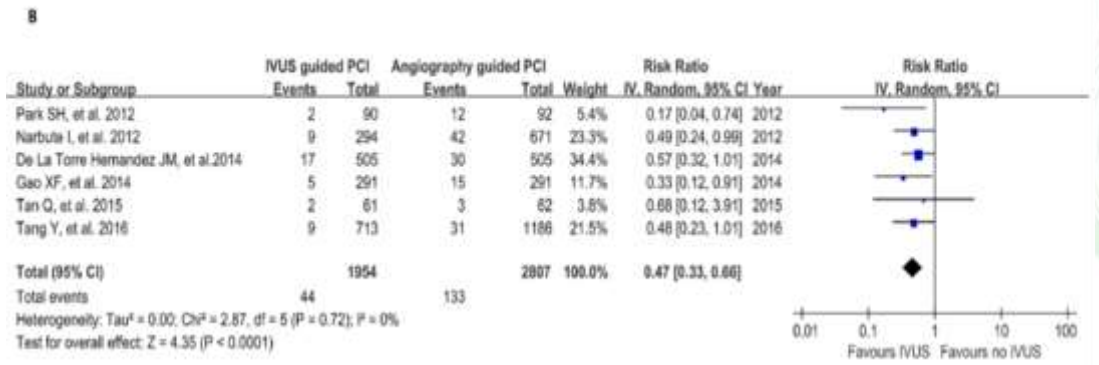
Examples of angiographic and IVUS findings in patients with “ostial” (A & B), “mid-shaft” (C & D) and “distal” (E & F) left main coronary lesions. (Percutaneous coronary intervention in left main coronary artery disease: the 13th consensus document from the European Bifurcation Club.)



In meta-analysis of 6480 patients with LMCA from 10 studies, IVUS guidance was associated with 40% reduction of all cause death and 53% reduction of cardiac death



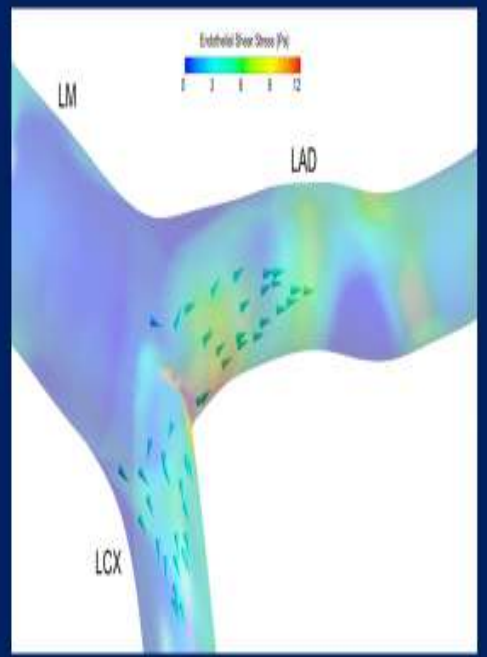




Percutaneous coronary intervention for aLL obstructive bifurcation lesions: the consensus document from the European Bifurcation Club (EBC)

- Keep it simple and safe,
- Understand and respect the original bifurcation anatomy,
- Optimise the flow and function of a bifurcation following percutaneous intervention,
- Limit the number of stents which should be well apposed and expanded with limited overlap.

Nearly 80 % of patients undergoing left main coronary artery (LMCA) stenting have disease involving the distal bifurcation (BF).

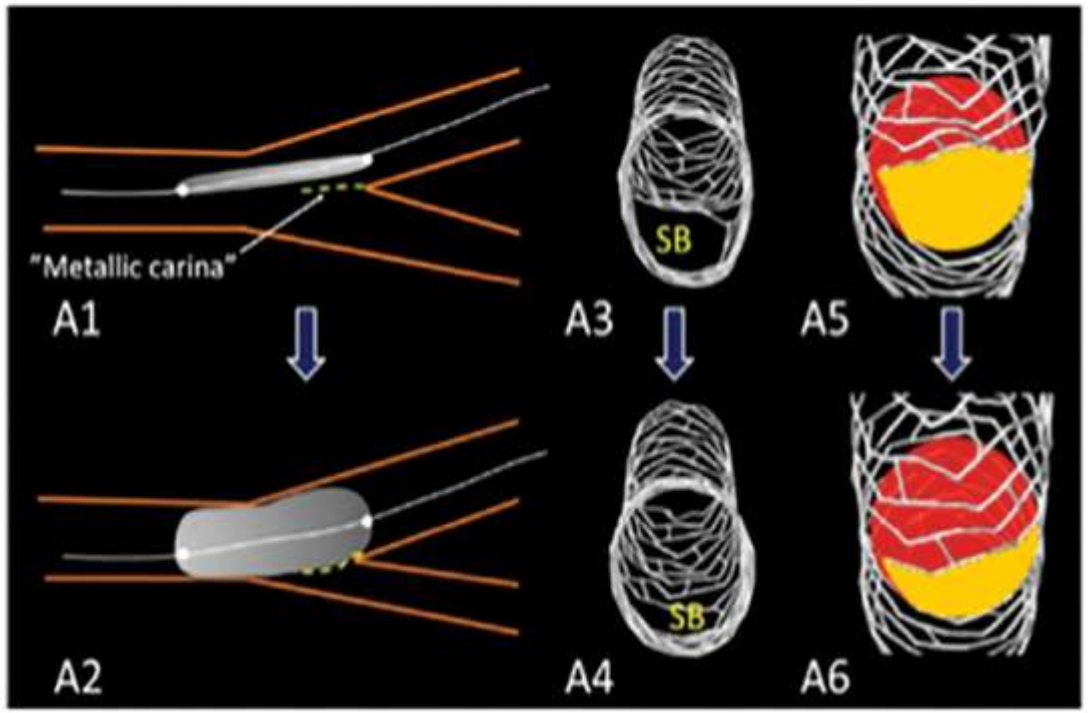


Unique features of LM bifurcation

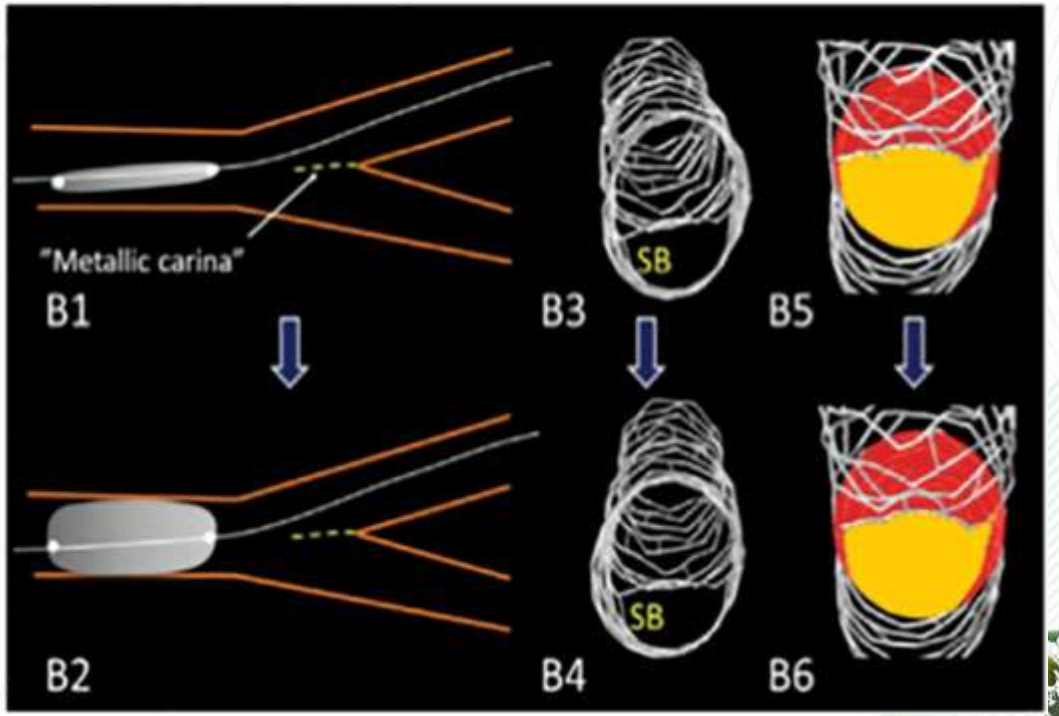
- Ostial position of the main vessel
- Large size of the side branch
- Frequency of Calcification
- Blunt bifurcation angle (T shape)
- Need for stents of variable suitability
- Crucial role of POT (proximal optimization technique)

LefevreT, Eurointervention 2015

Final POT across SB ostia



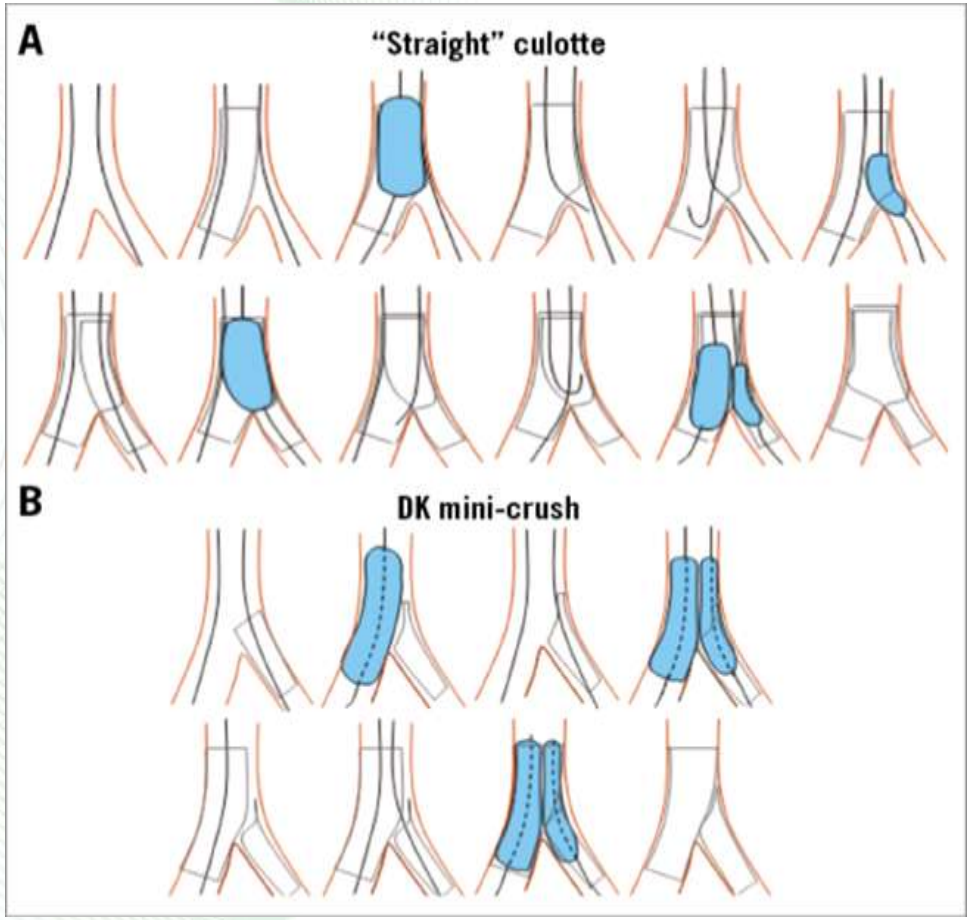
Final POT proximal to SB ostia



DEFINITION CRITERIA

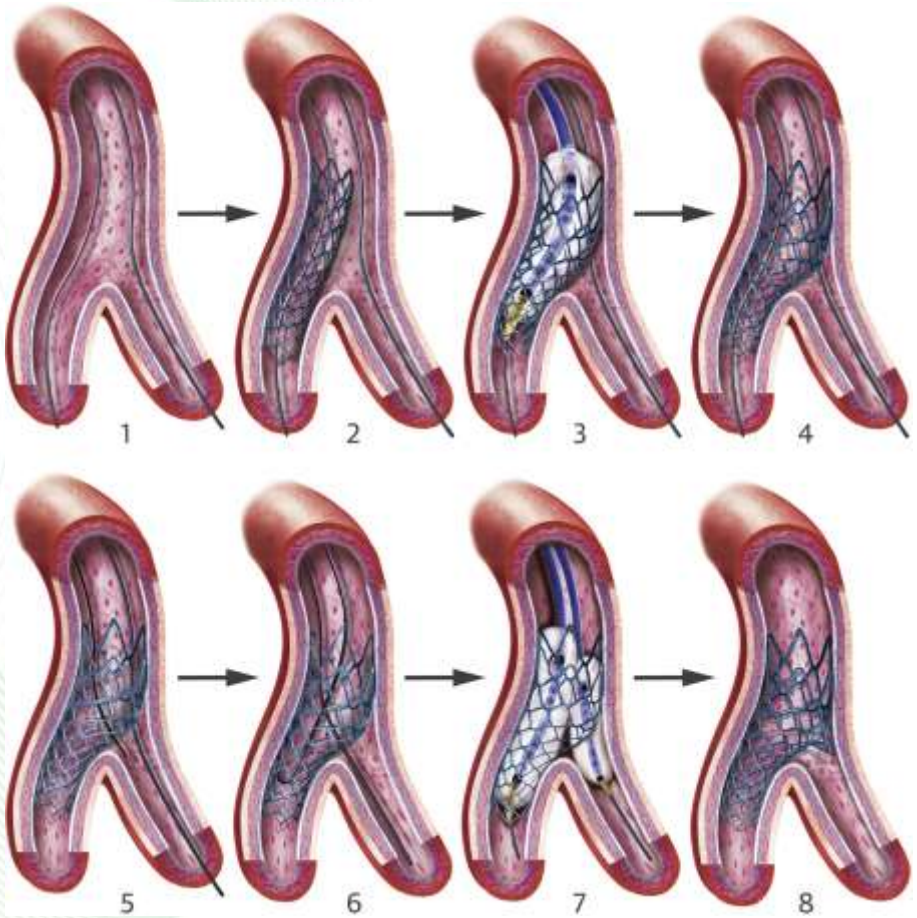
Major criteria	Minor criteria
For left main distal bifurcation lesions - SB lesion length ≥10 mm AND - SB diameter stenosis ≥70% For non-left main distal bifurcation lesions - SB lesion length ≥10 mm AND - SB diameter stenosis ≥90%	Moderate to severe calcification Multiple lesions Bifurcation angle <45° or >70° Main vessel reference vessel diameter <2.5 mm Thrombus-containing lesions Main vessel lesion length ≥25 mm

Upfront two-stent approach

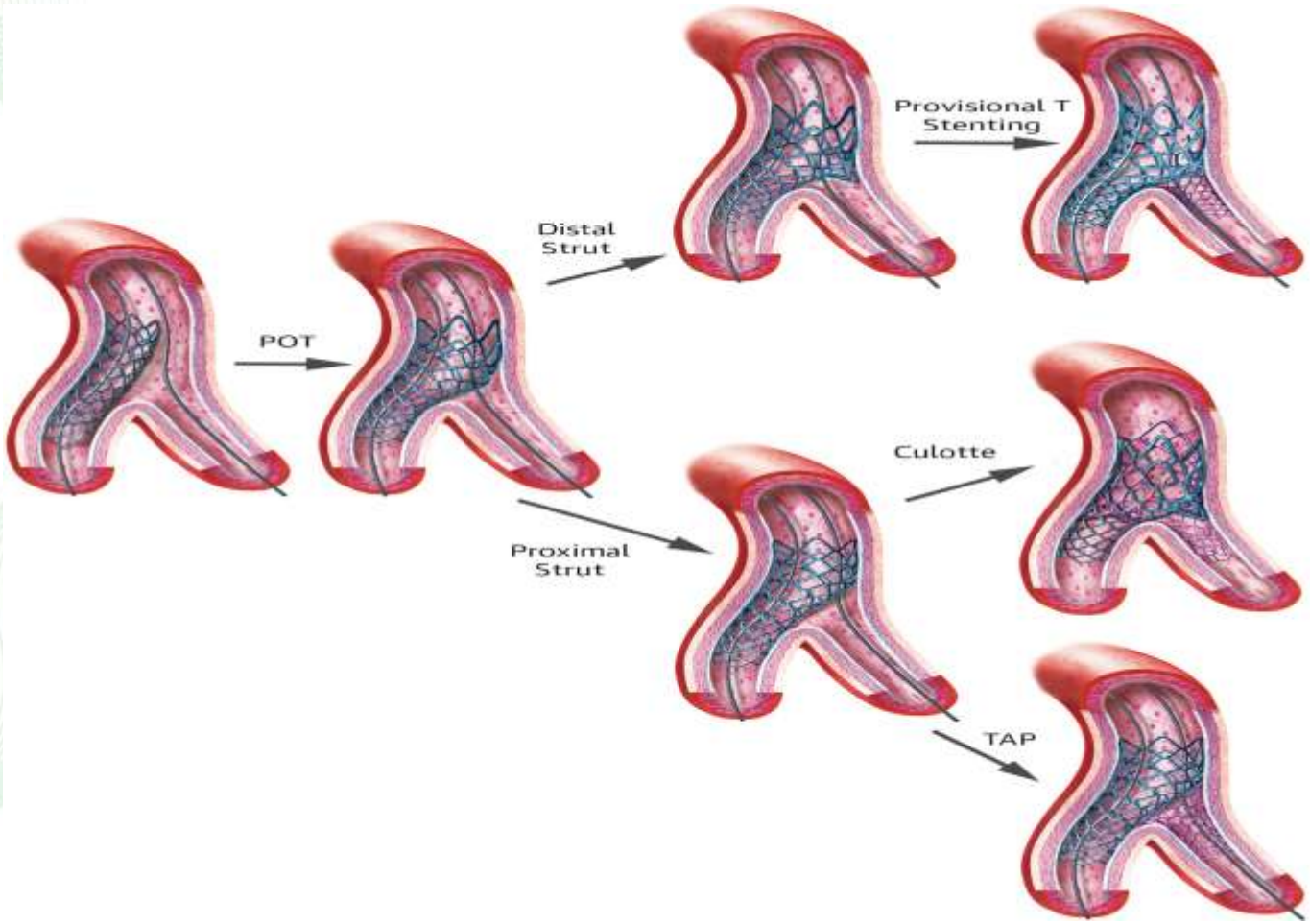


- Procedure Simultaneous stenting of both main and side branch using tecniques like DK Crush or Culotte
- Advantages: Better scaffolding of both branches, potentially lower restenosis rates in complex bifurcations.
- Disadvantages: Increased procedural complexity, longer operation time, higher risk of complications.

Provisional stenting approach



- Procedure : Stent in main vessel , assess side branch ;perform baloon angioplasty or stenting if required
- Advantages : Simpler procedure, reduced stent usage , shorter operation time
- Disadvantages : Potential for side branch occlusion or restenosis


POT
Distal Strut
Provisional T Stenting
Proximal Strut
Culotte
TAP

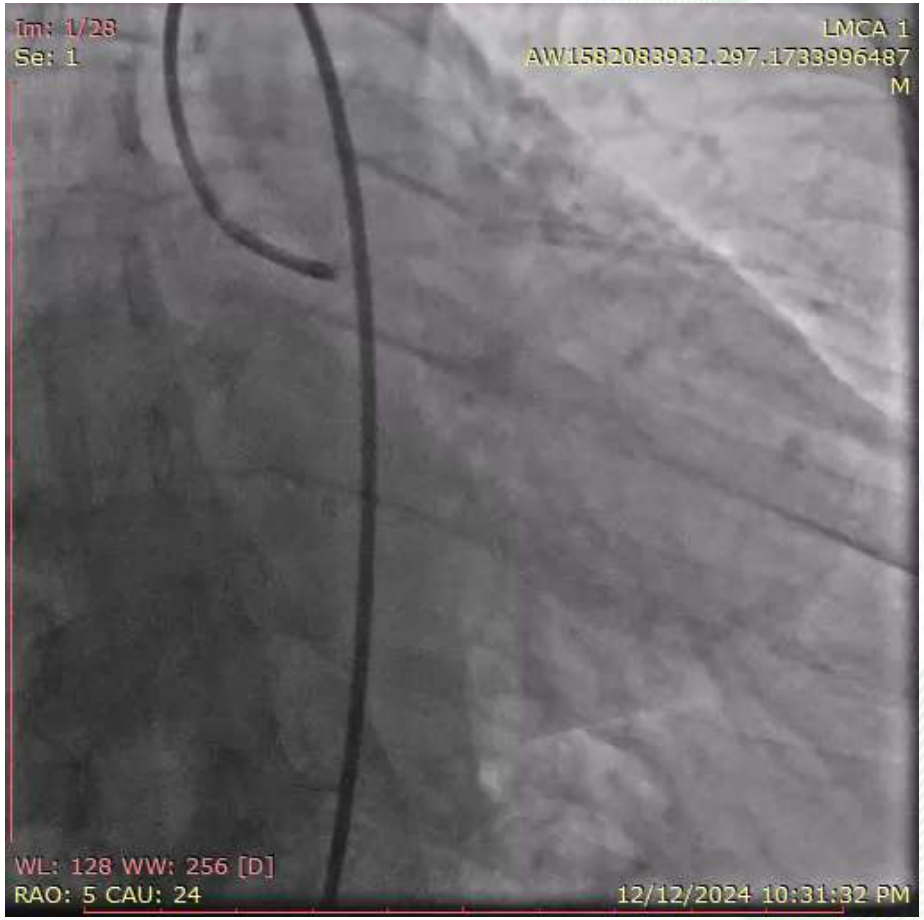
DK Crush

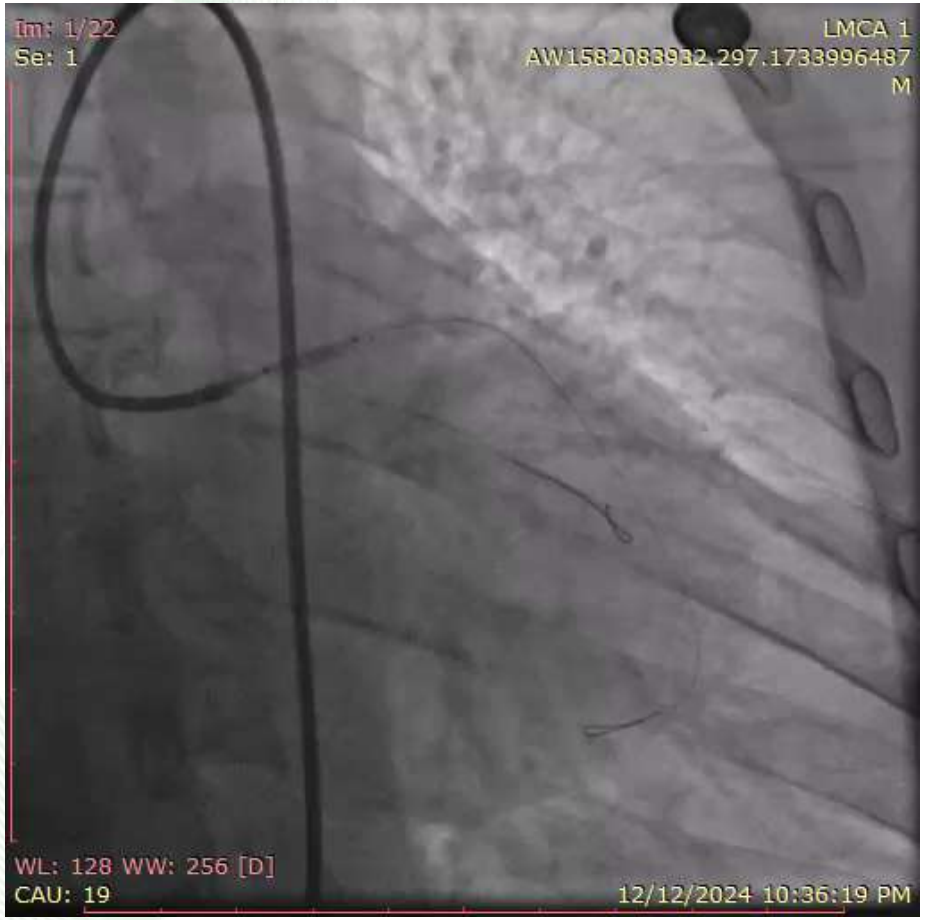
Culotte

TAP (T and Protrusion)

Provisional to TAP

- 65 y.old male with diabetes ,uses optimal dosage of statin,aspirin and nebivalol
- 5 Years ago Inferior MI and DES implant to RCA and LAD
- ECG and ECHO is normal , RCA angiogram is normal (Right dominant)
- Bilateral carotis occlusion > 50%
- MEDINA 1,1,0

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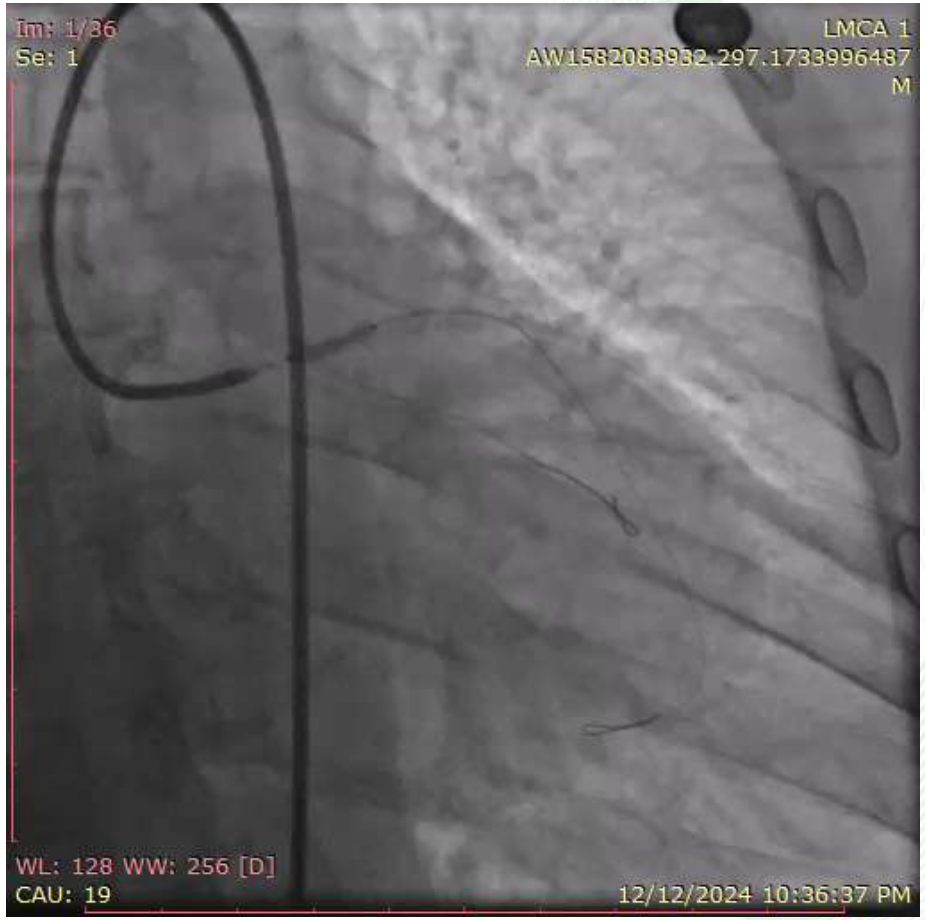
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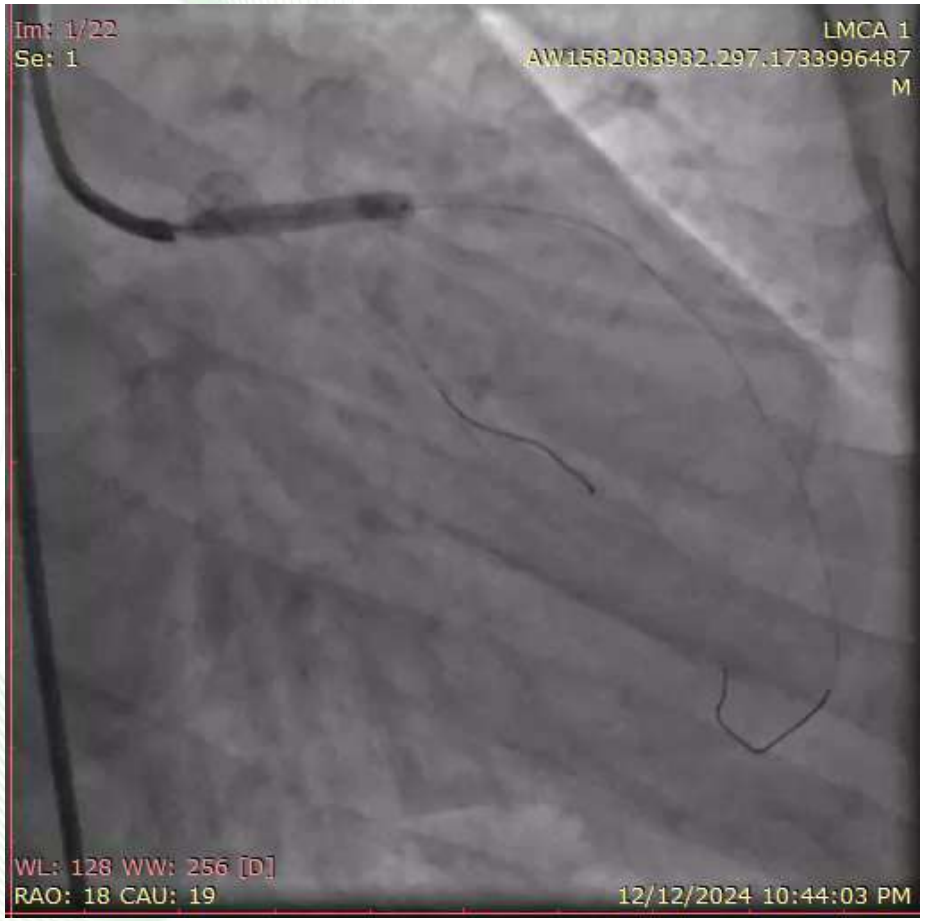
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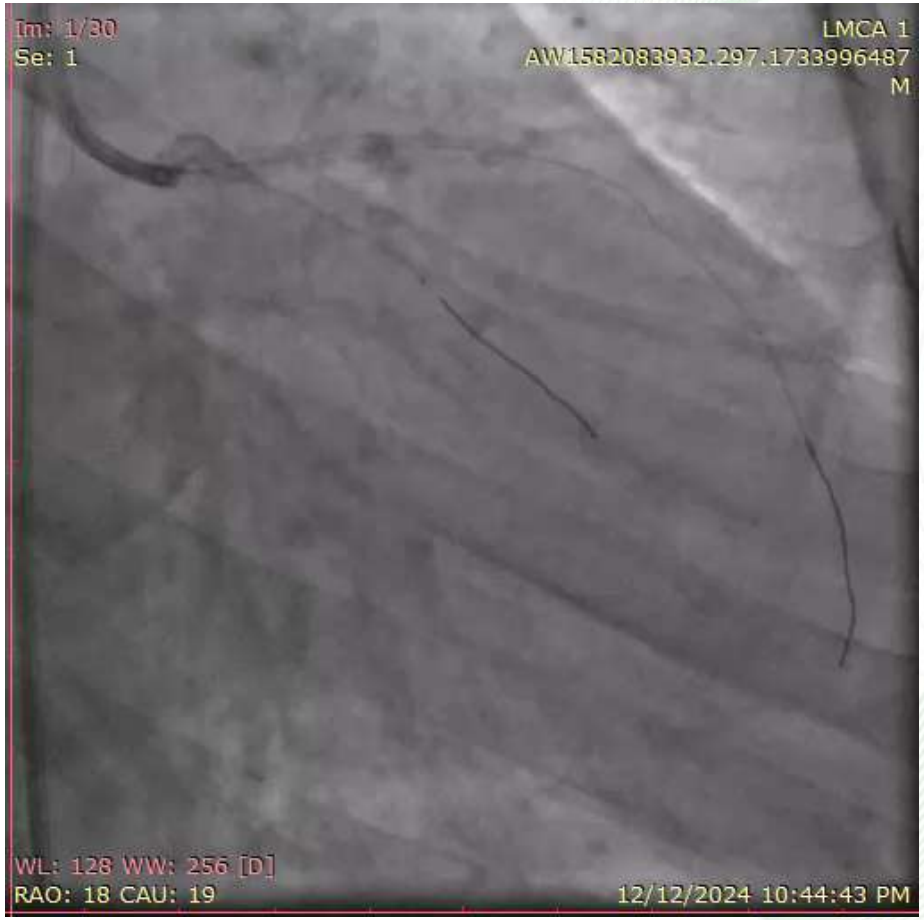
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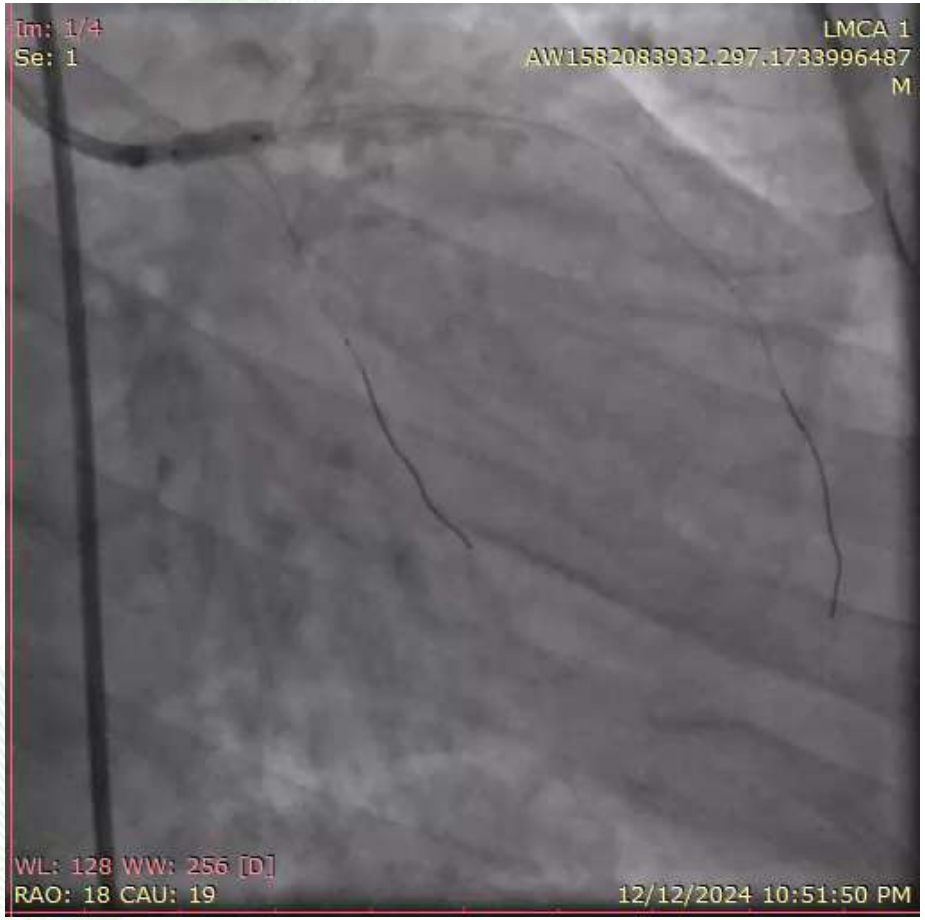
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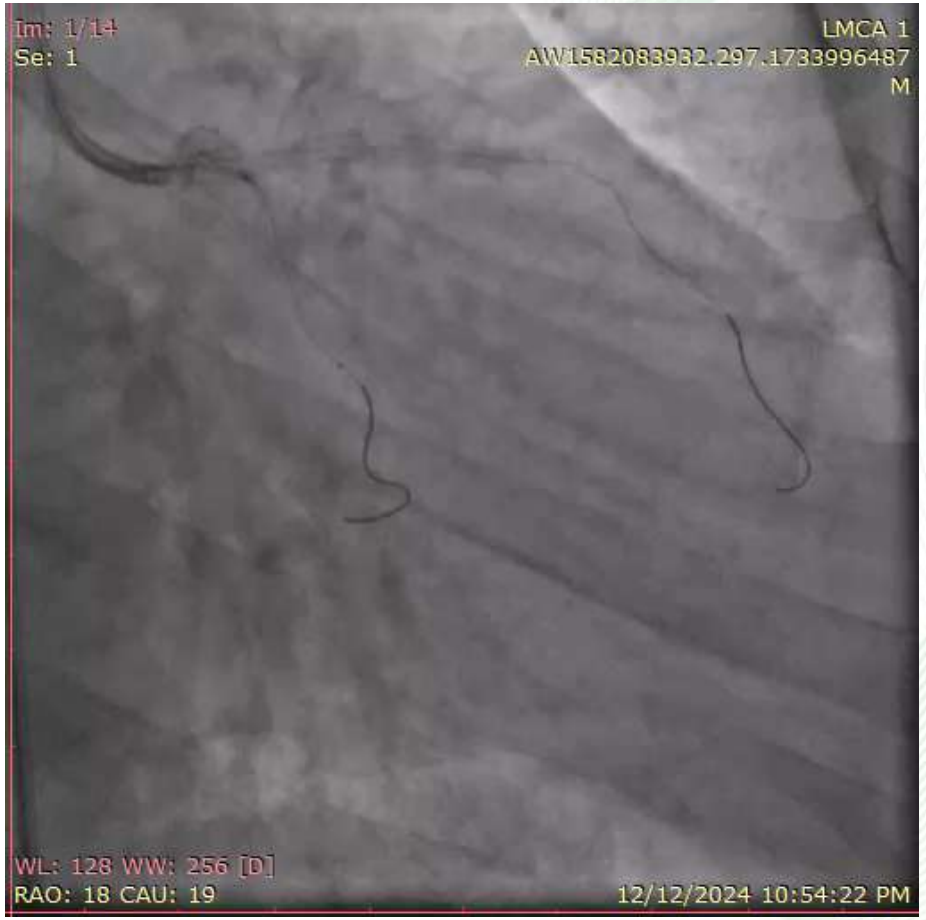
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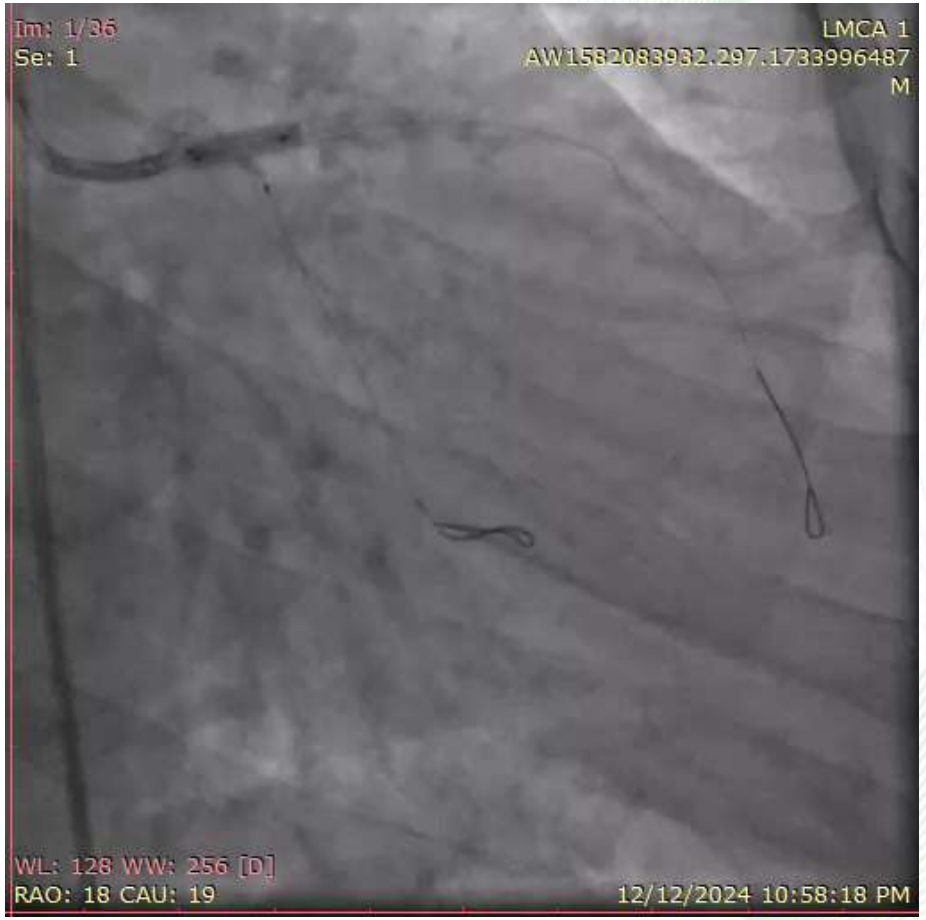
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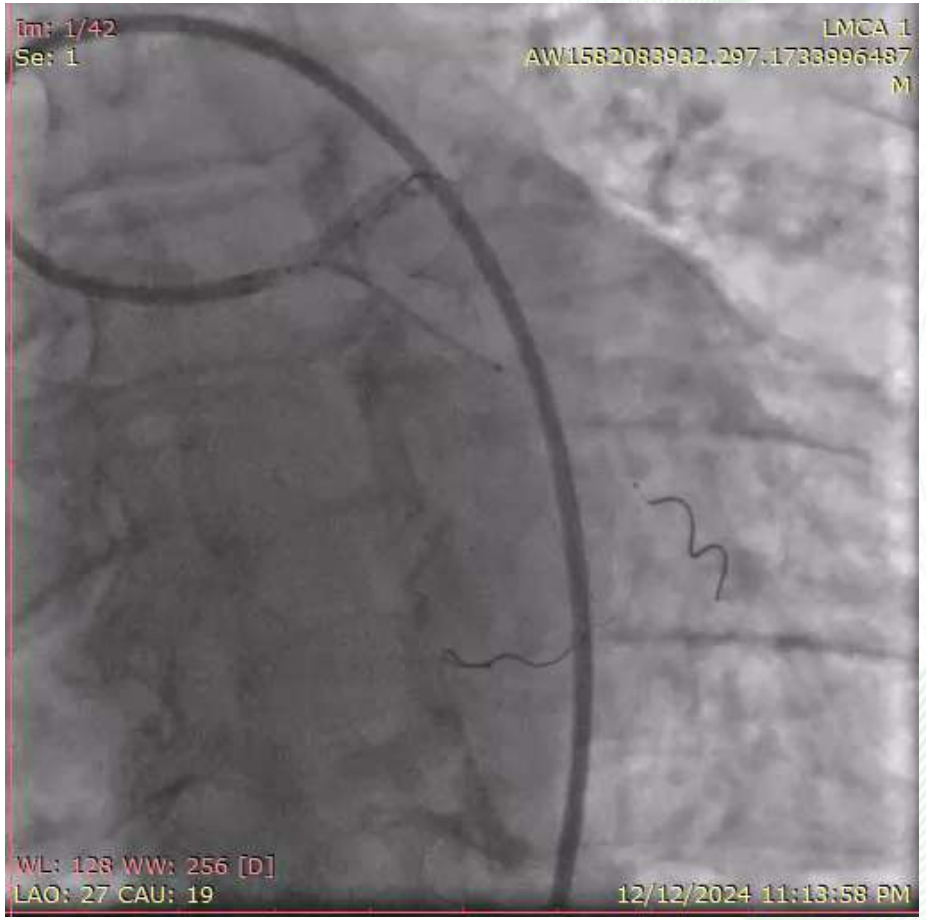
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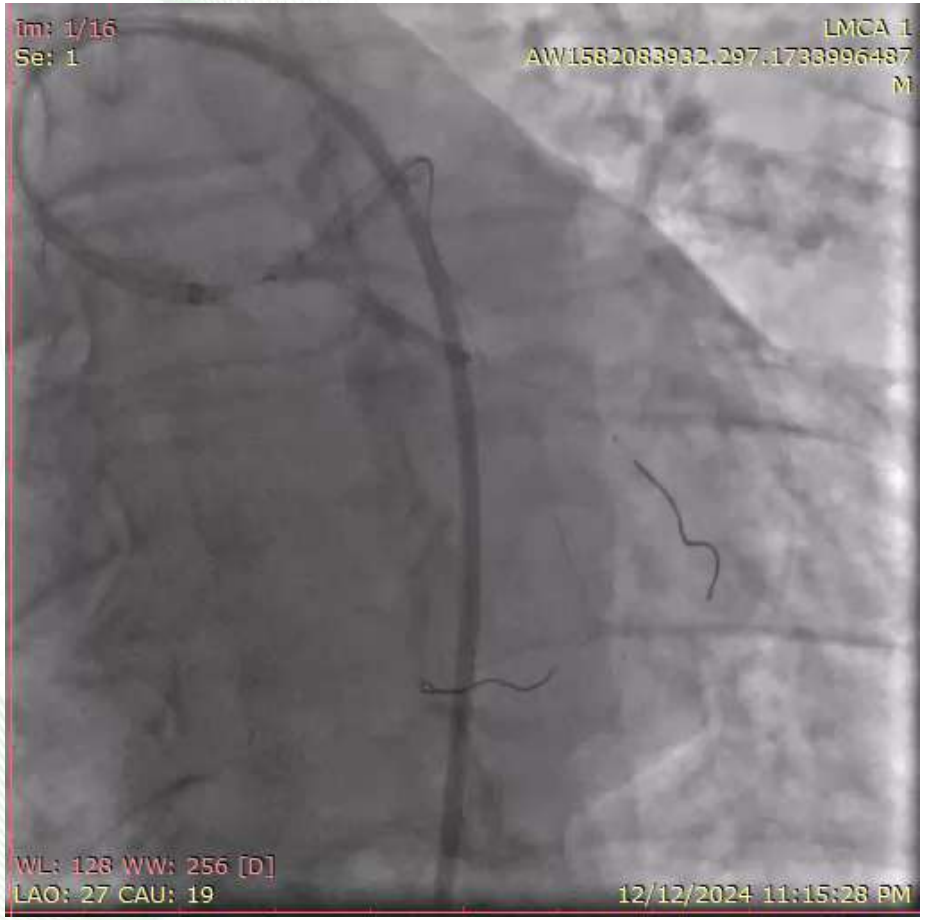
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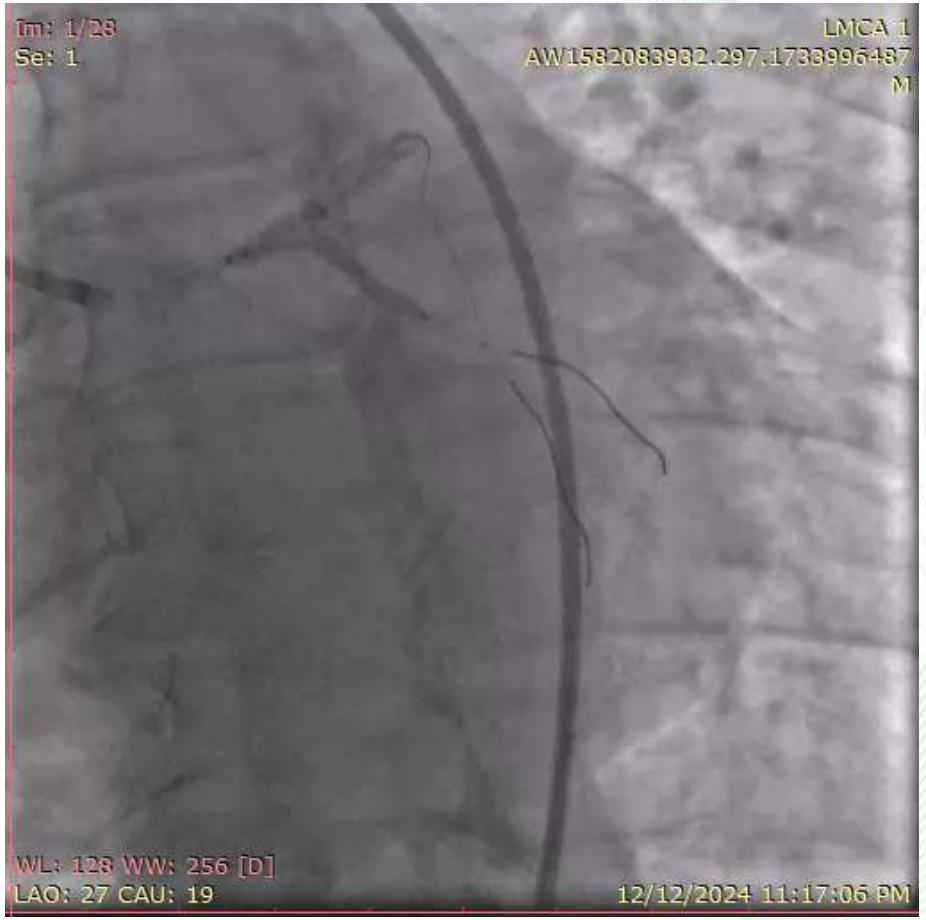
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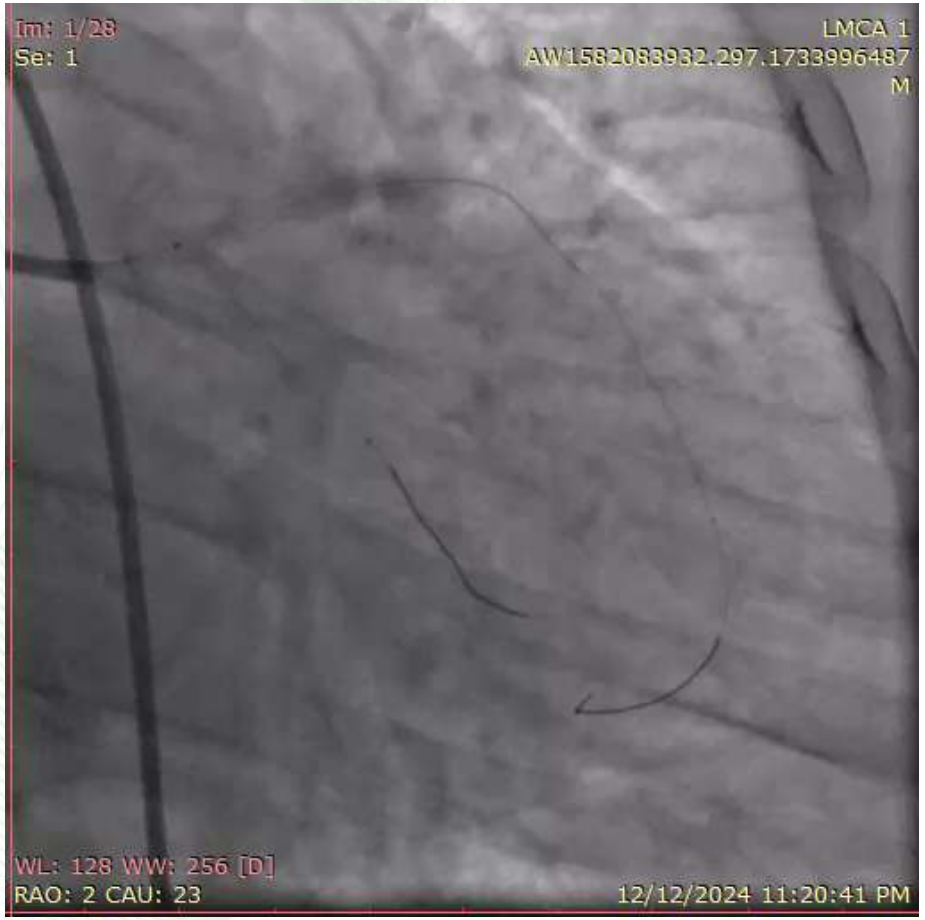
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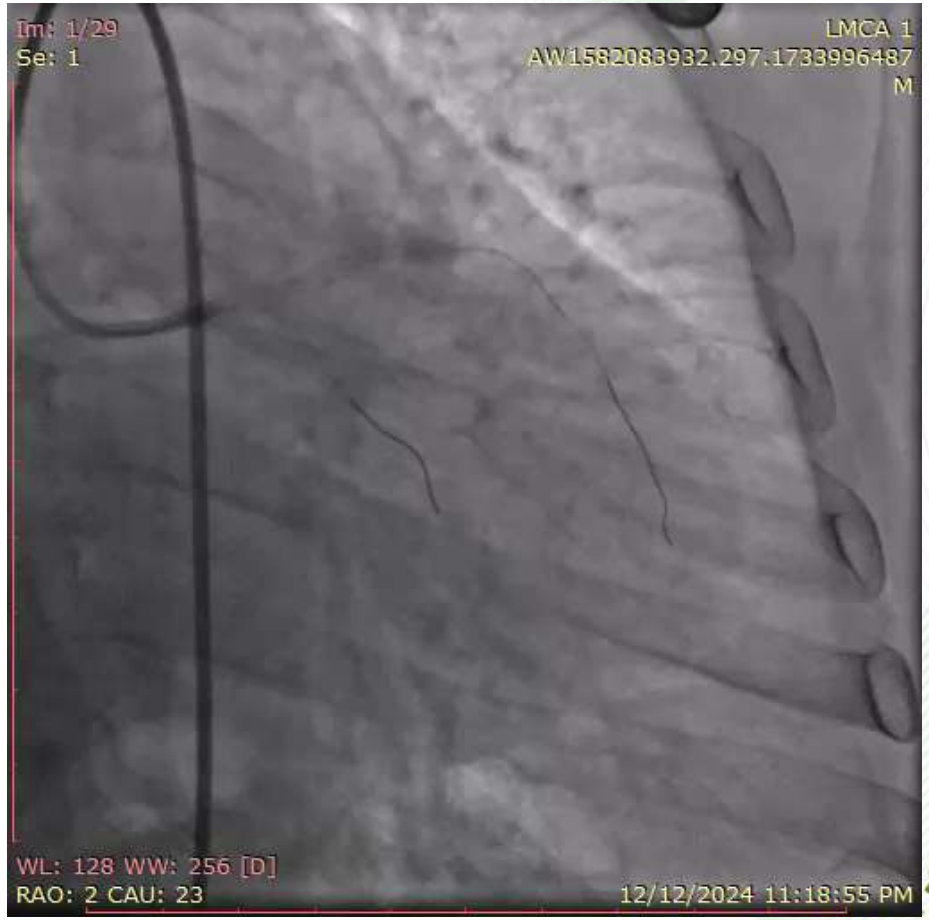
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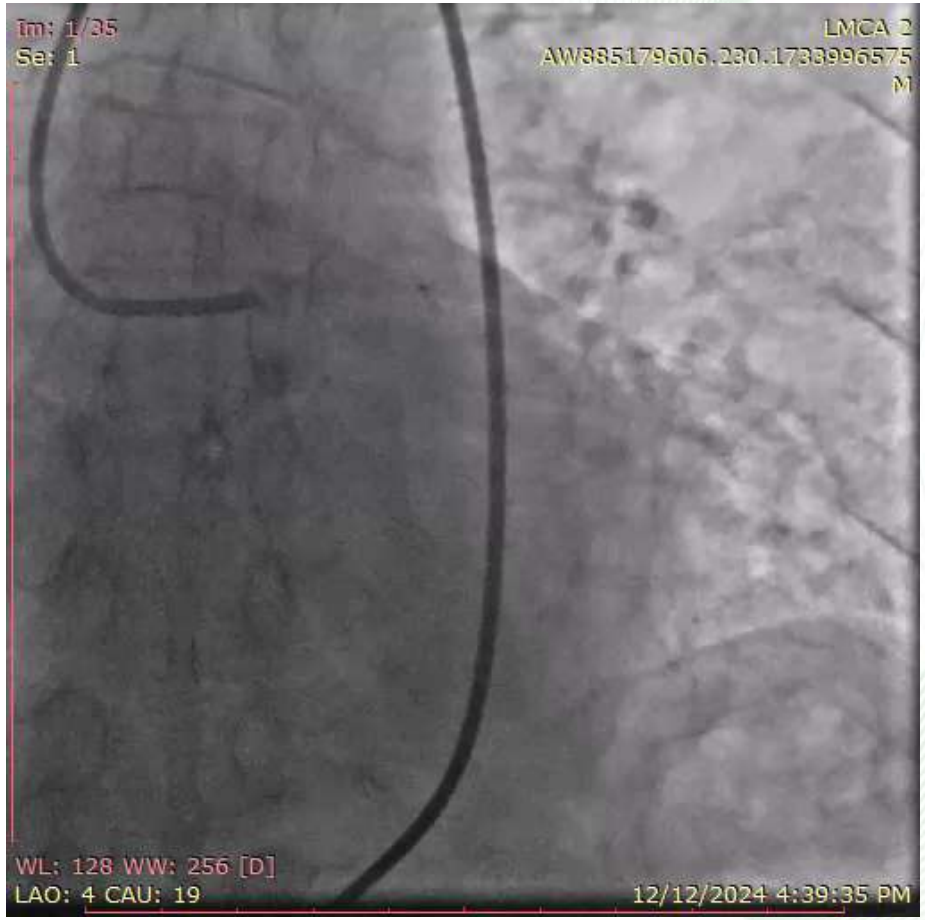
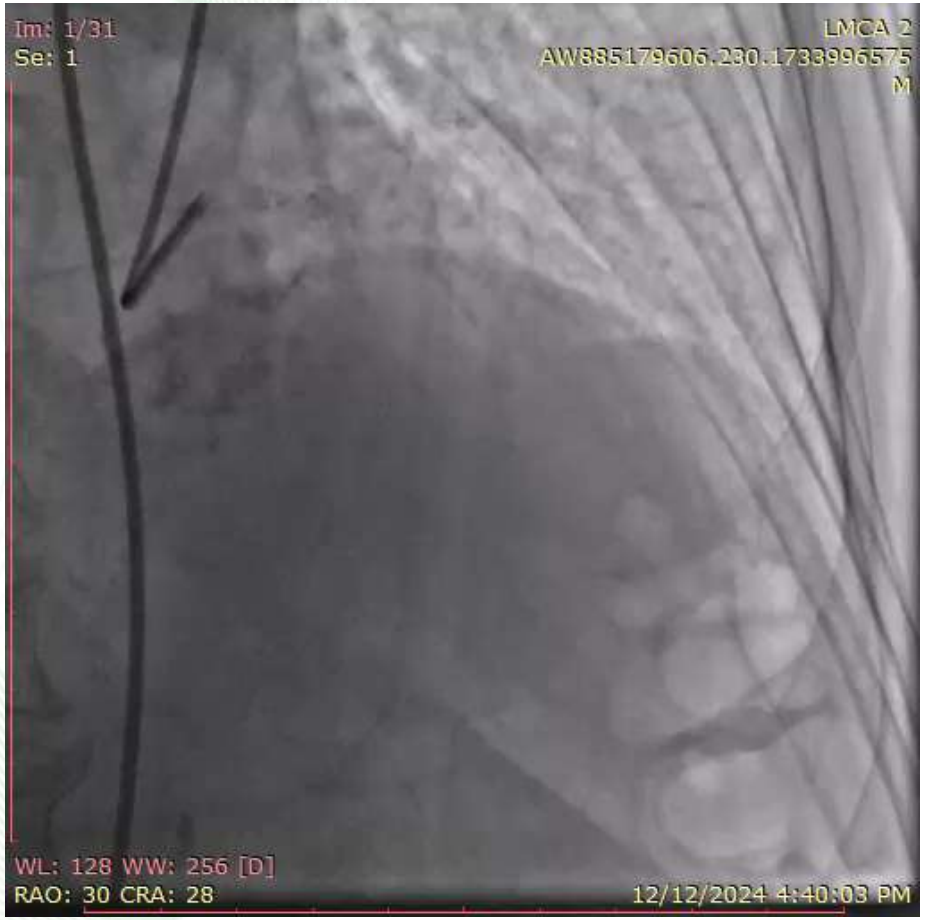
DK-Crush

- 85 y.old male with severe AS
- MEDINA 1,1,1
- EF 55%

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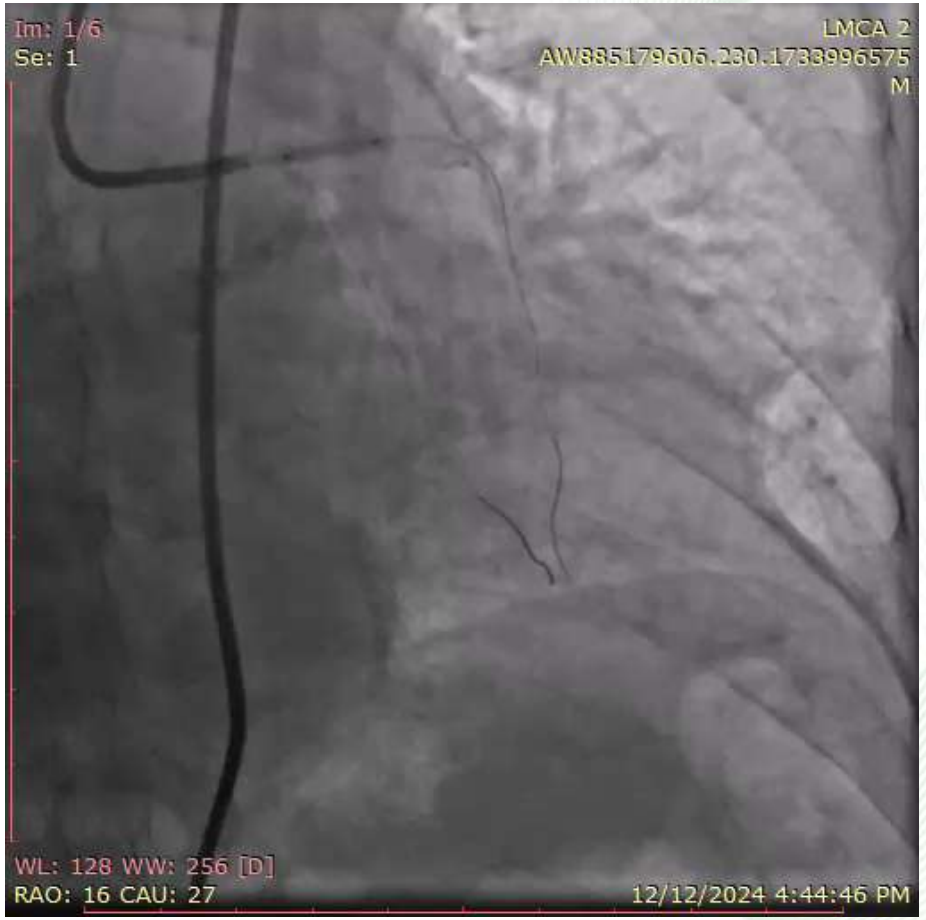
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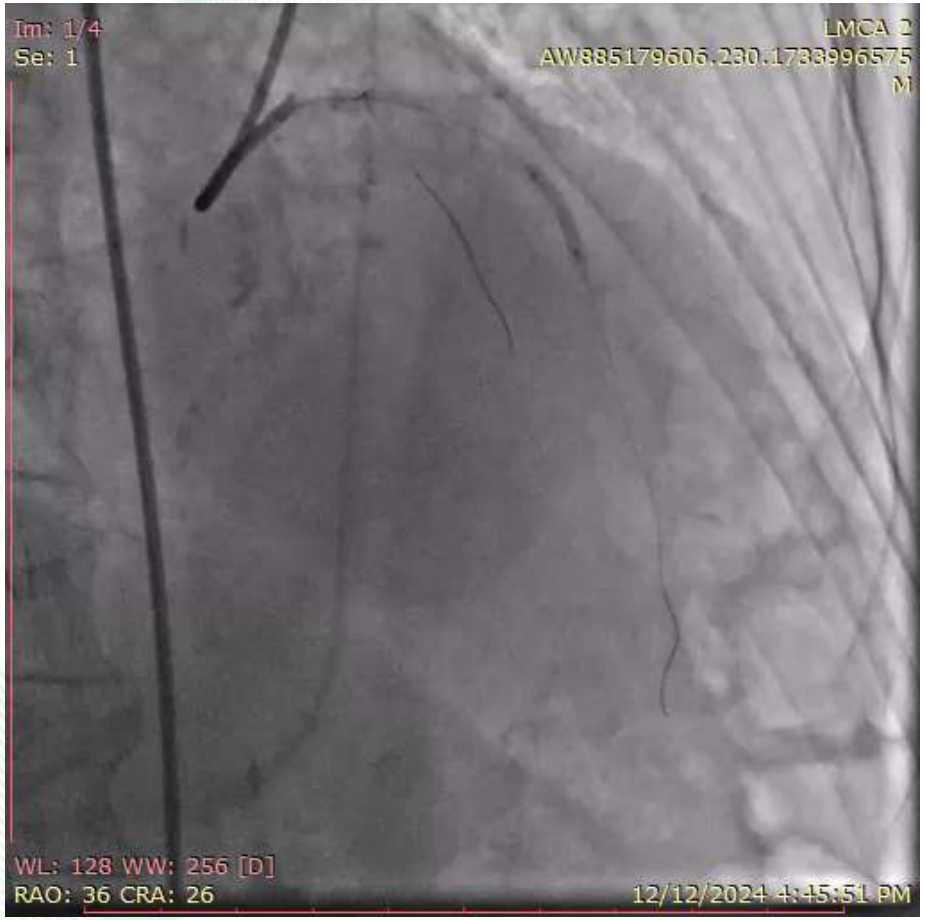
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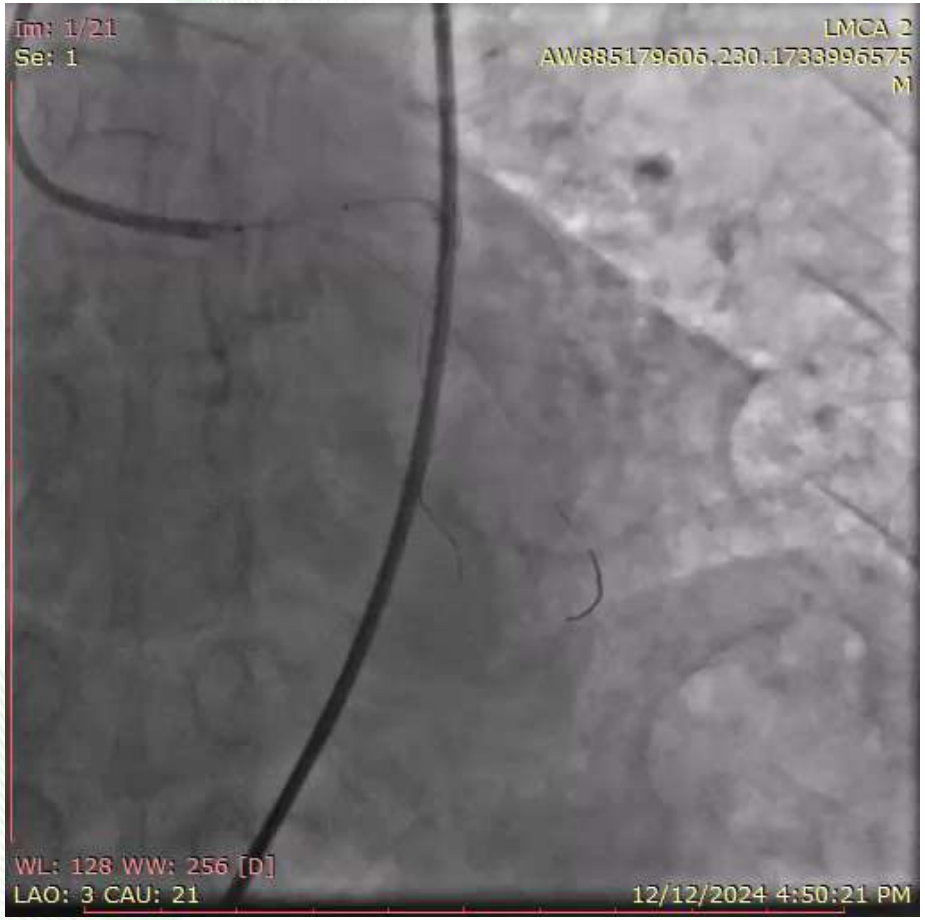
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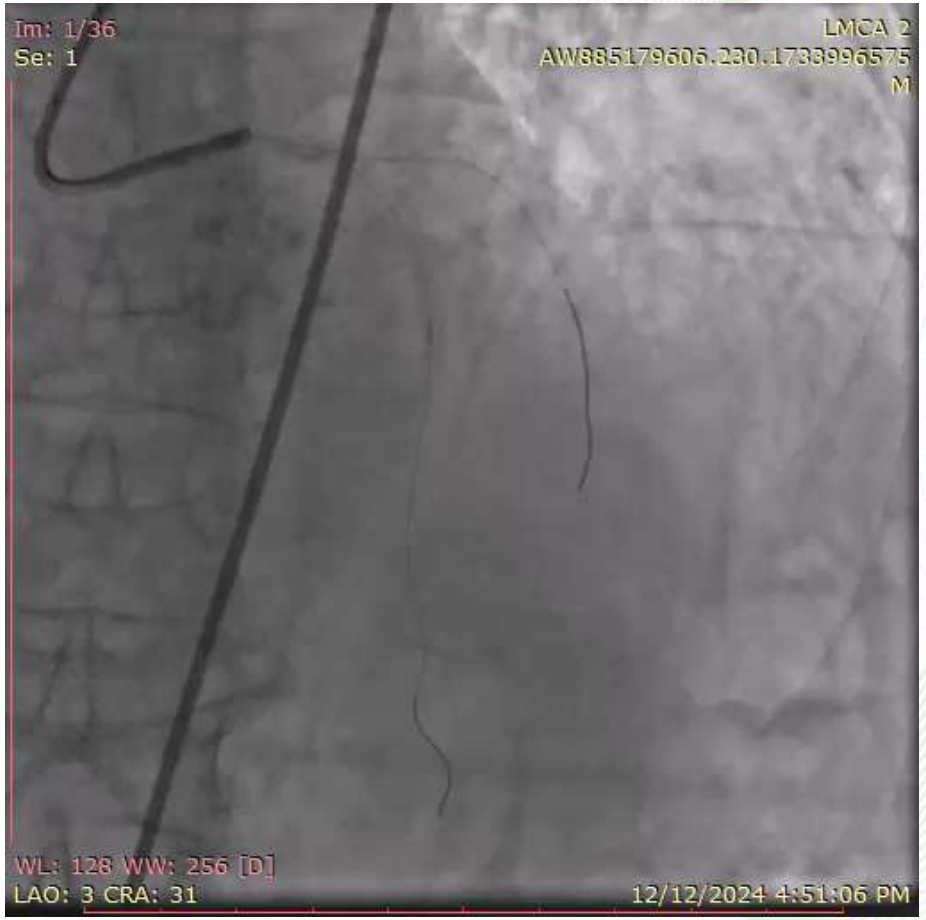
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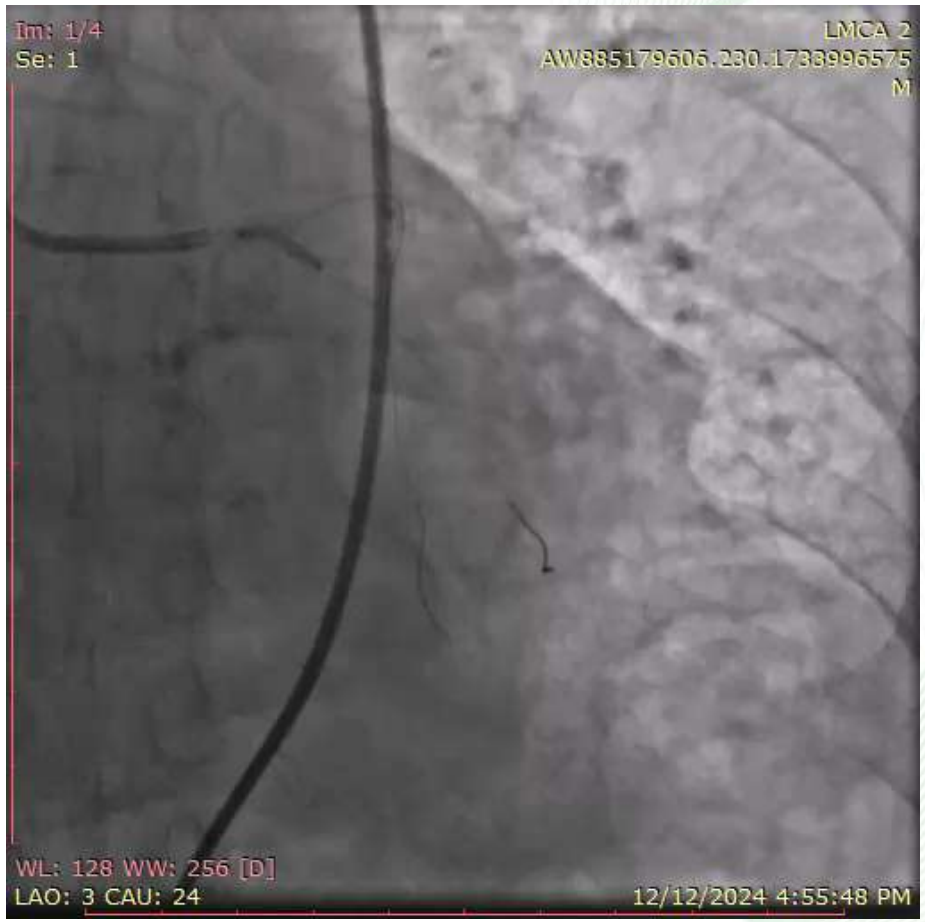
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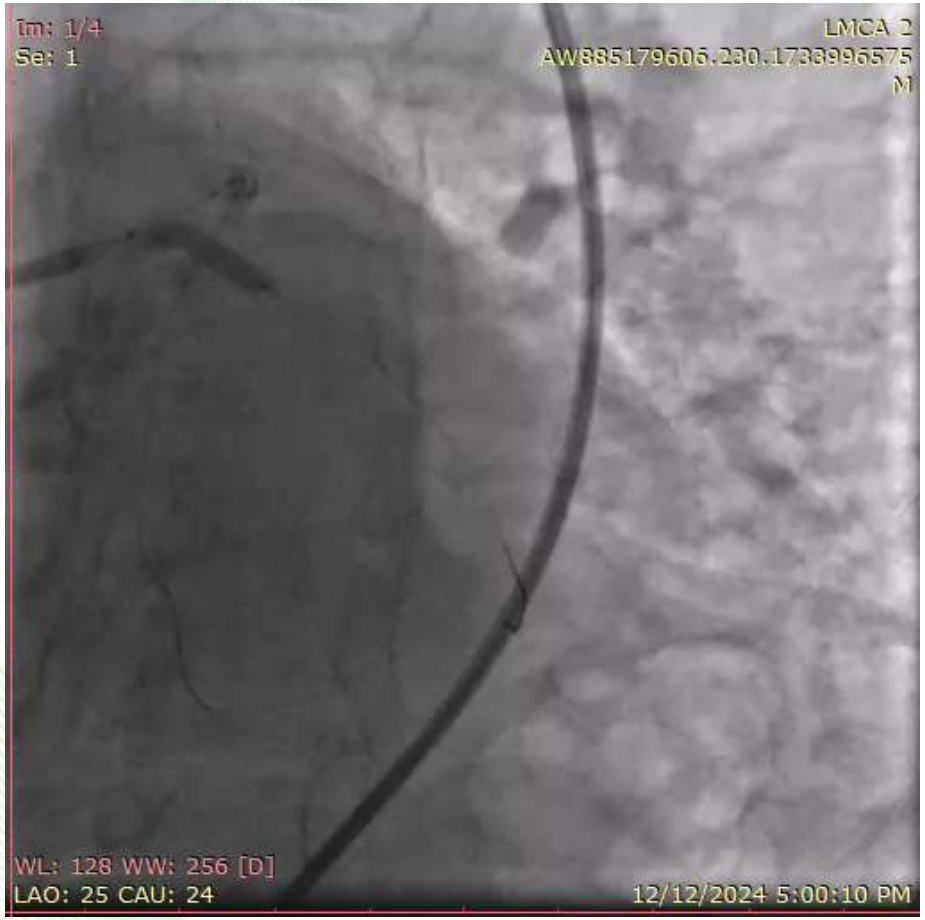
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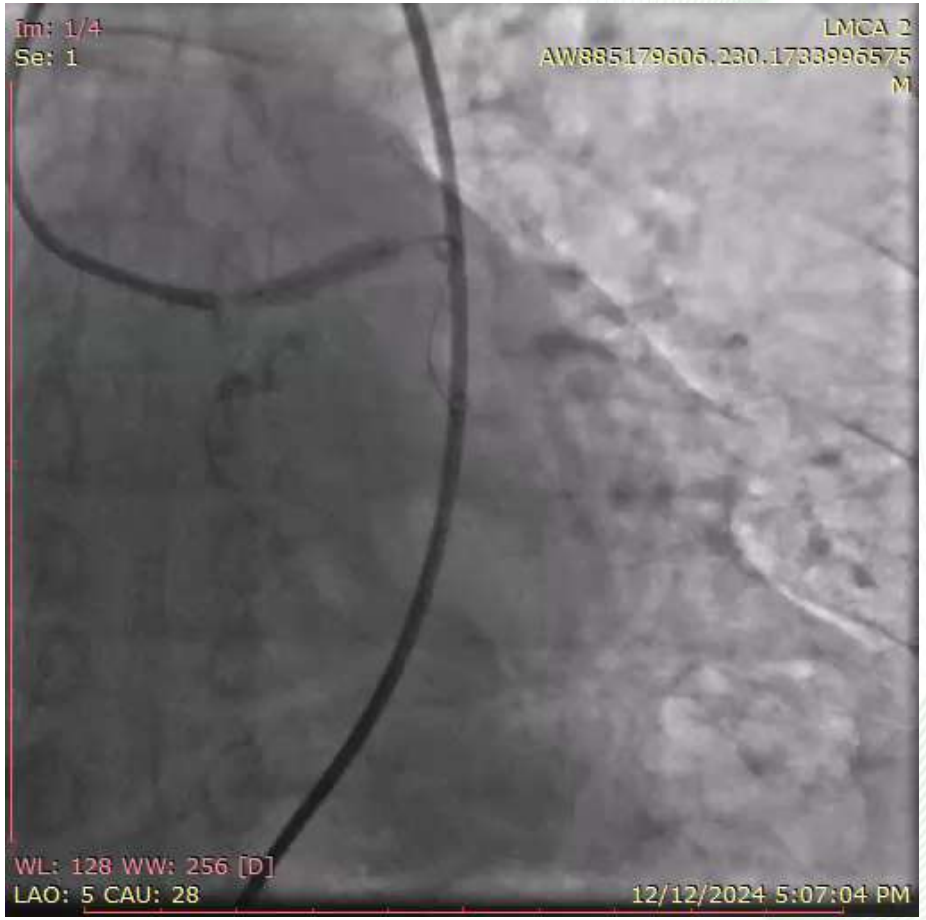
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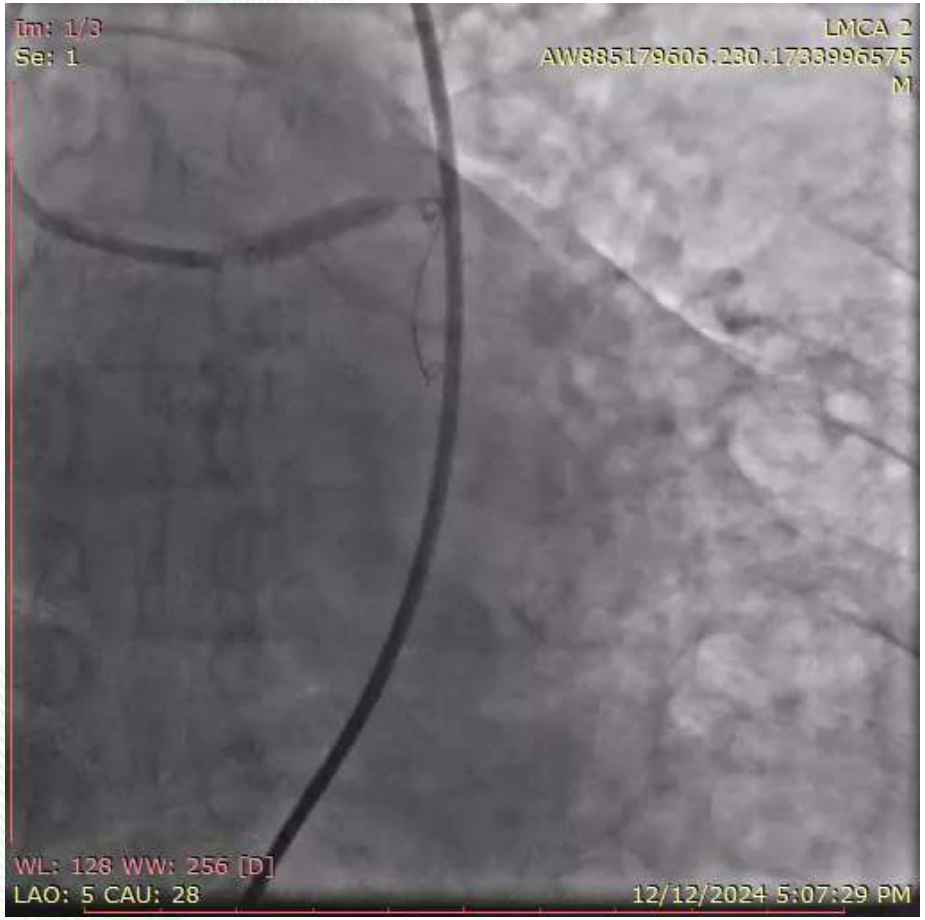
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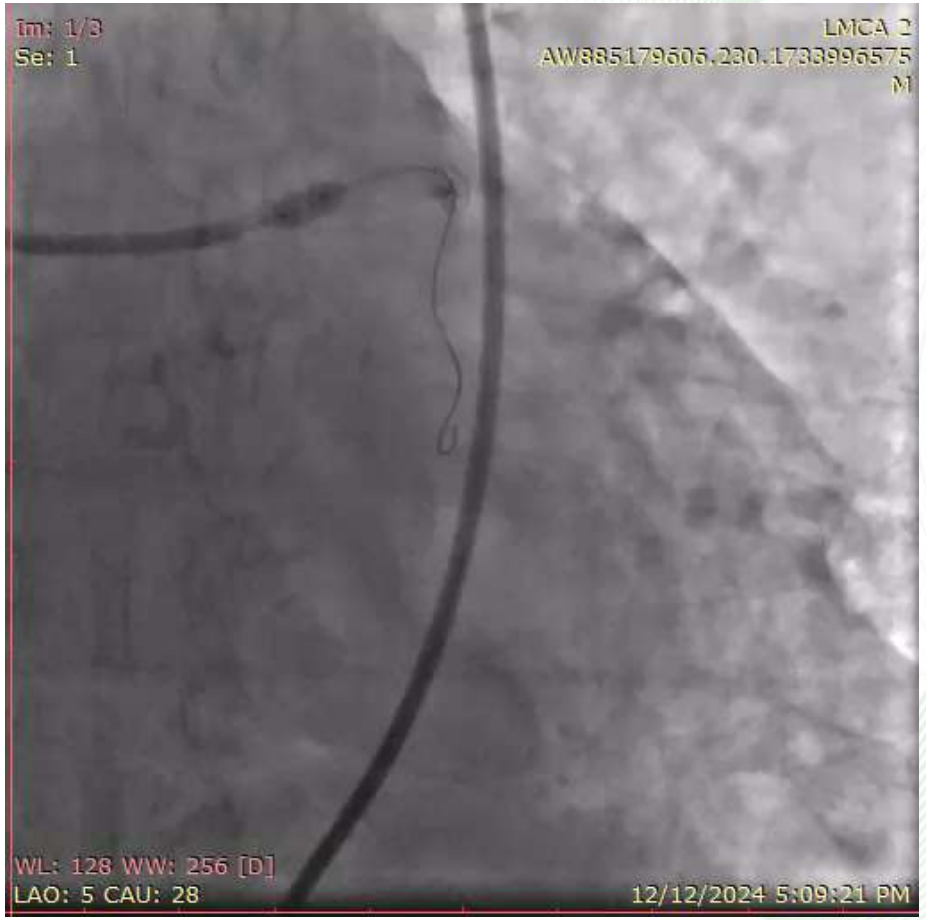
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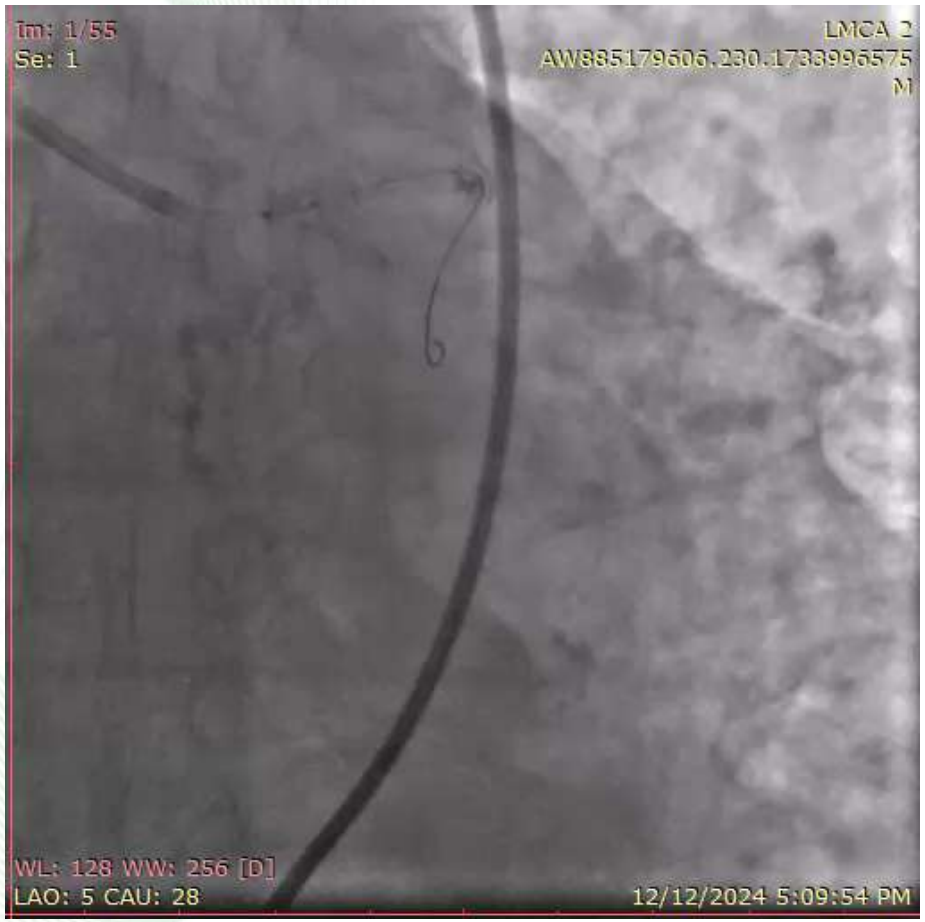
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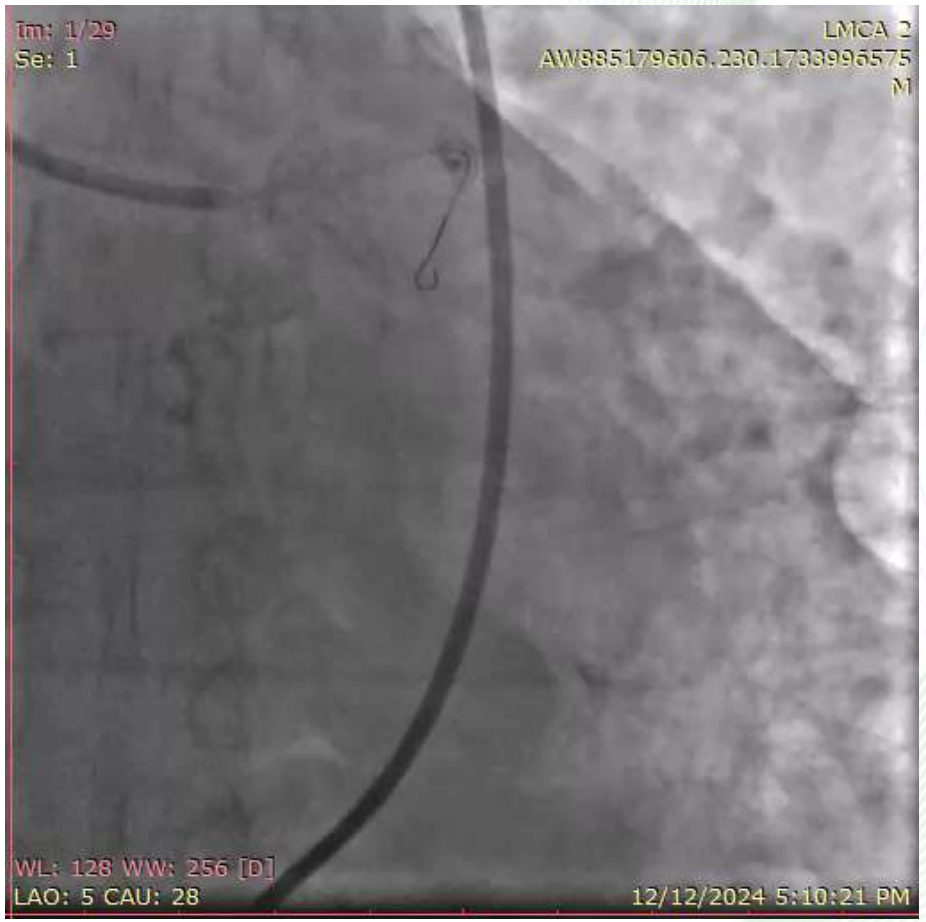
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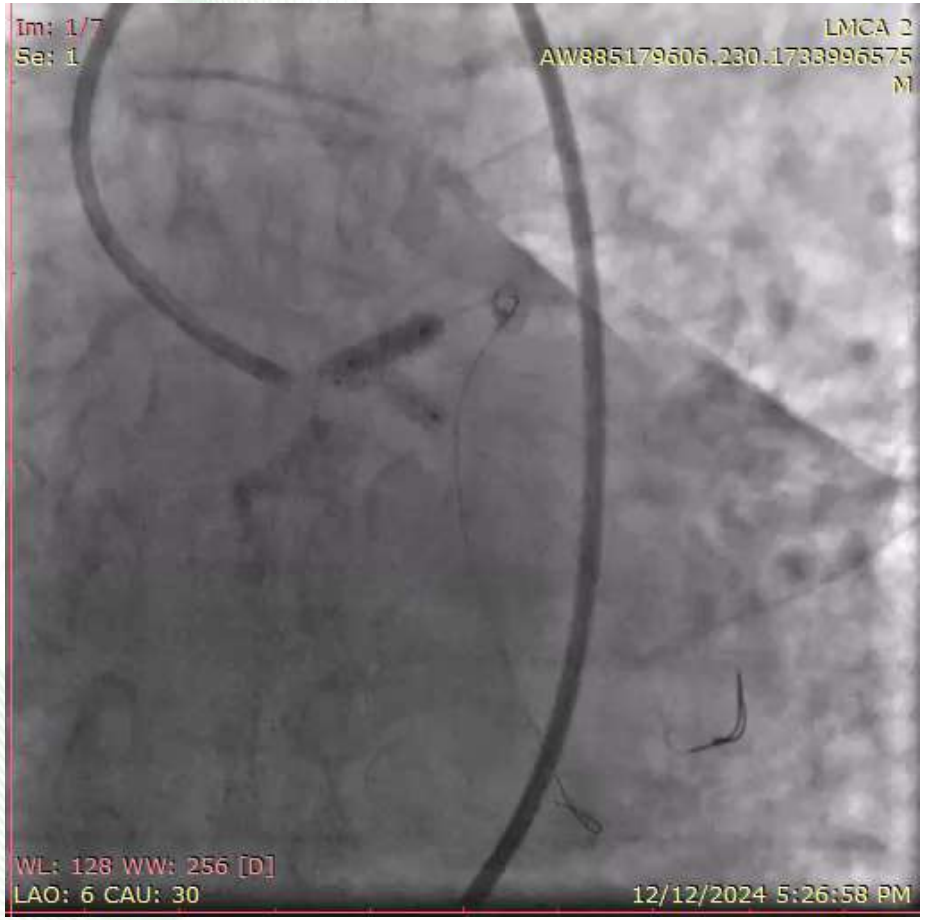
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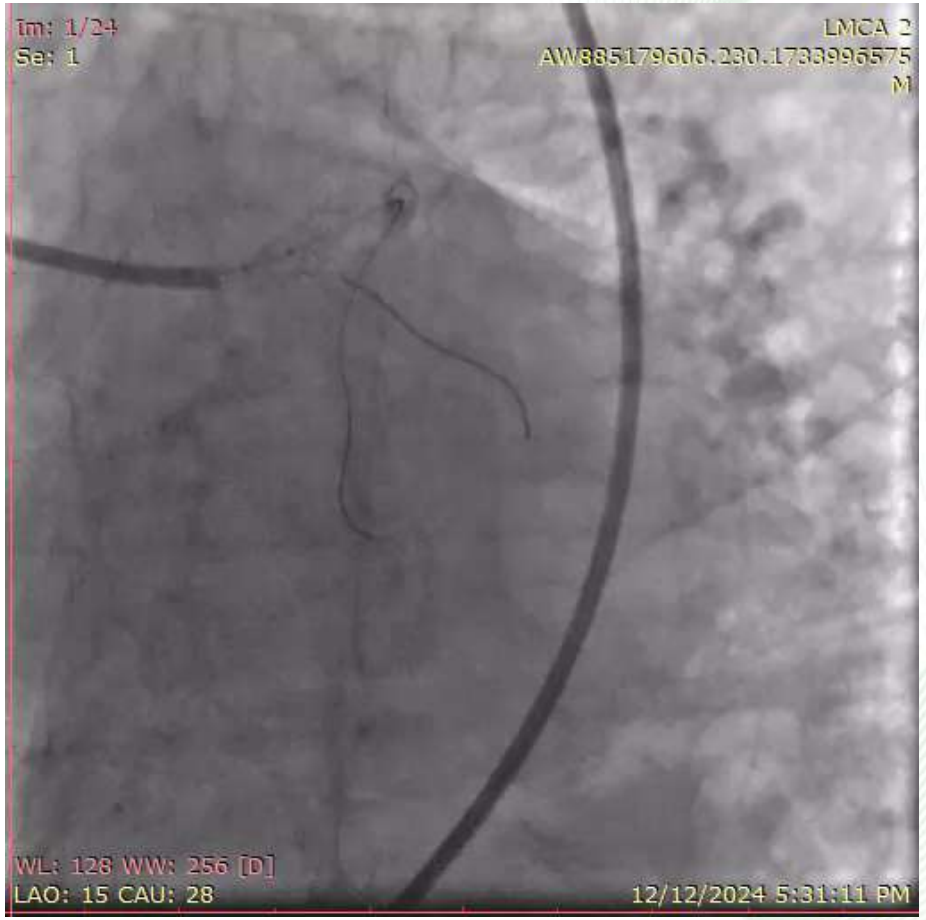
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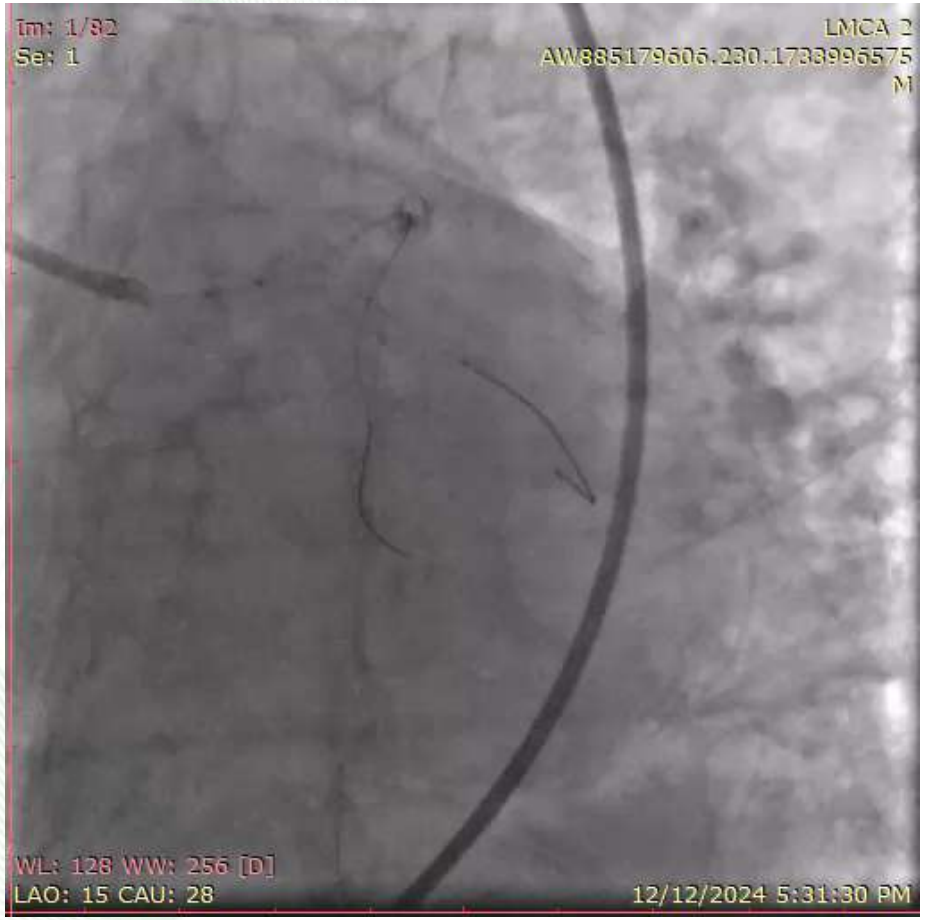
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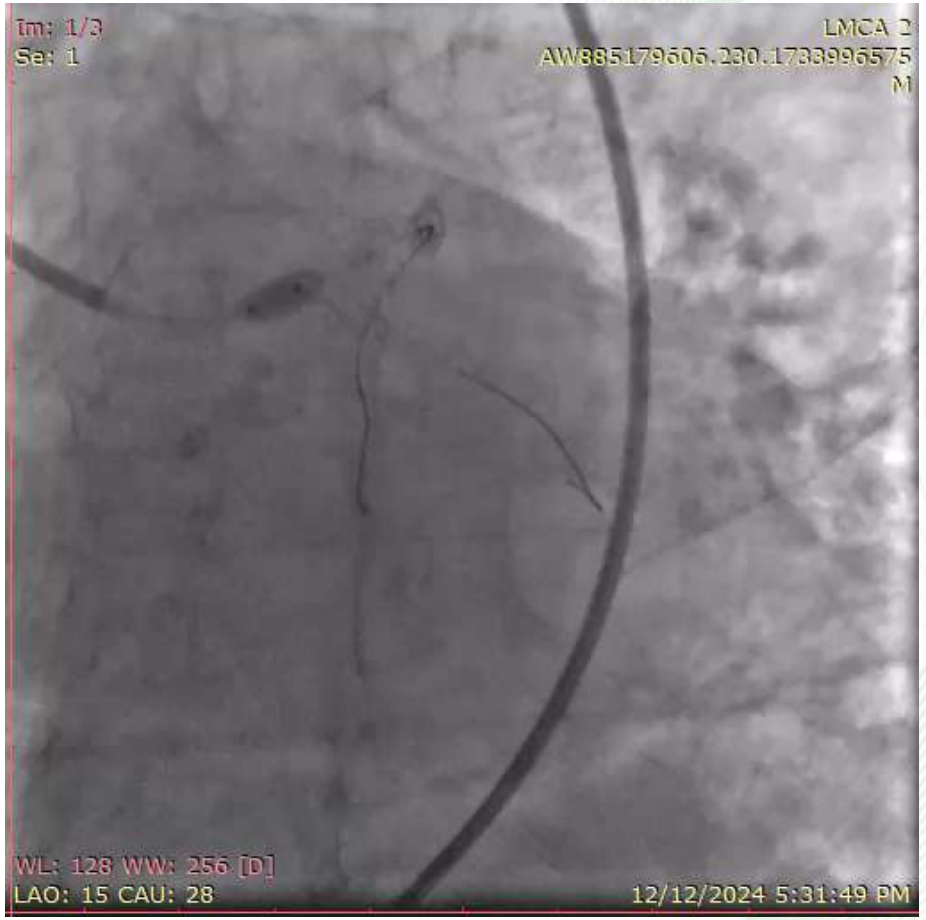
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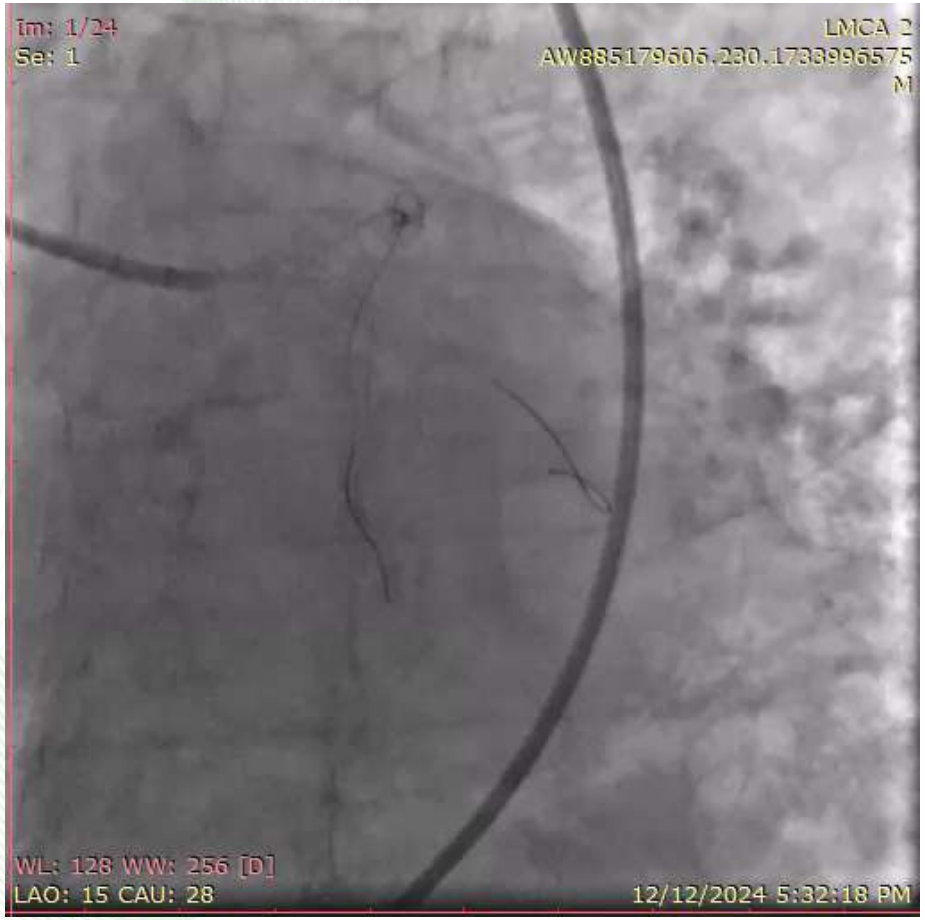
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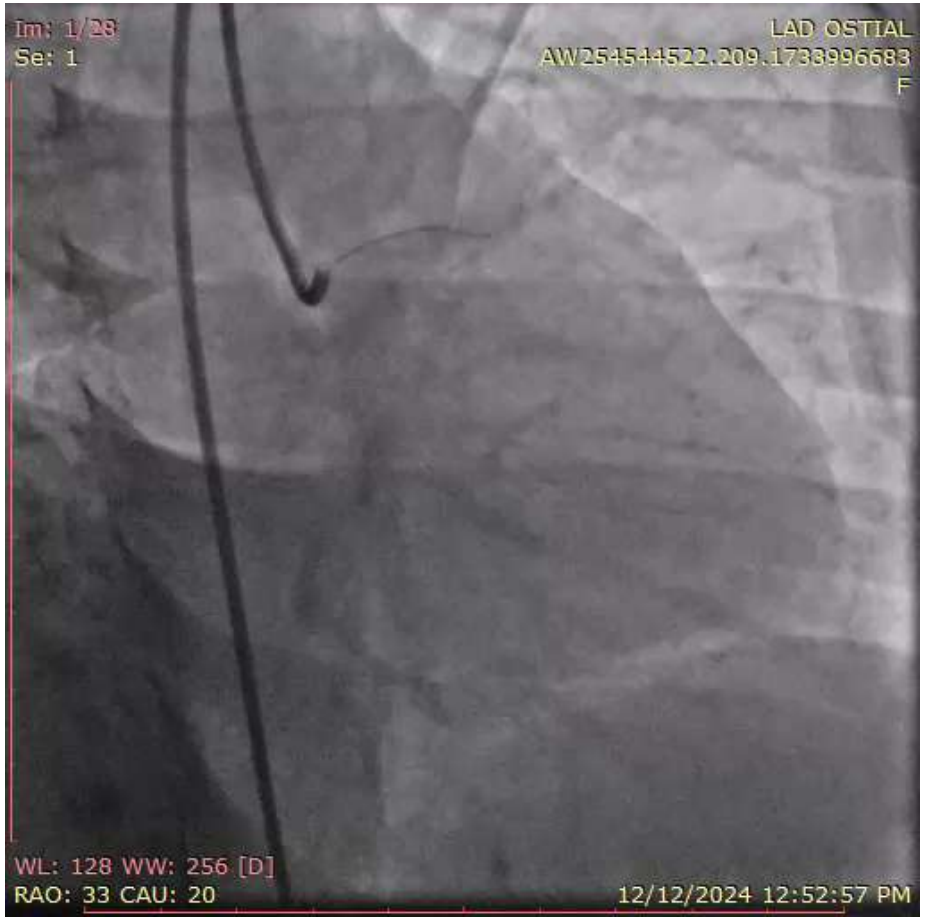
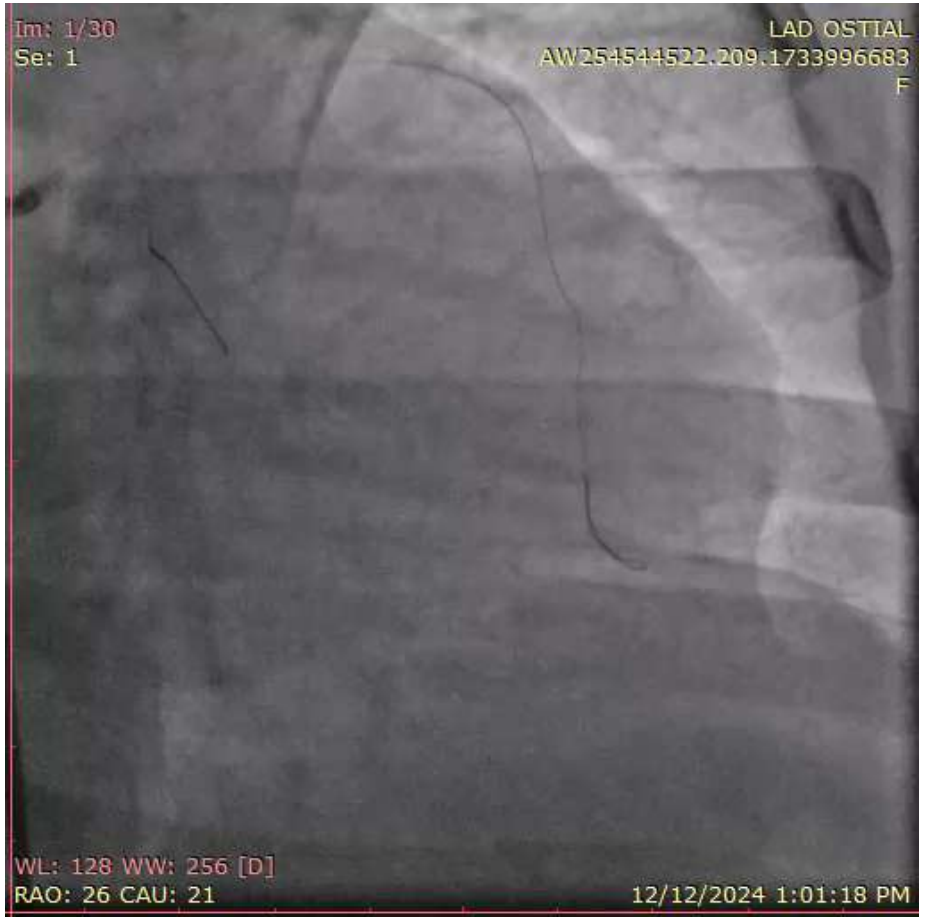
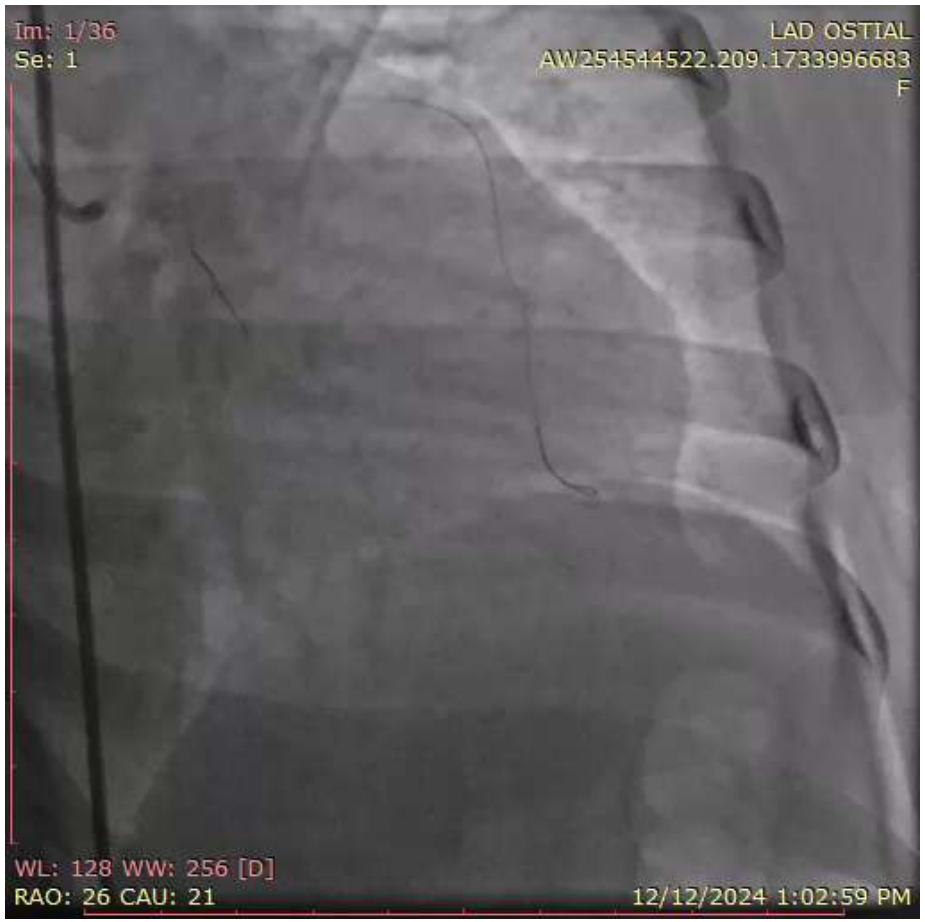
Provisional



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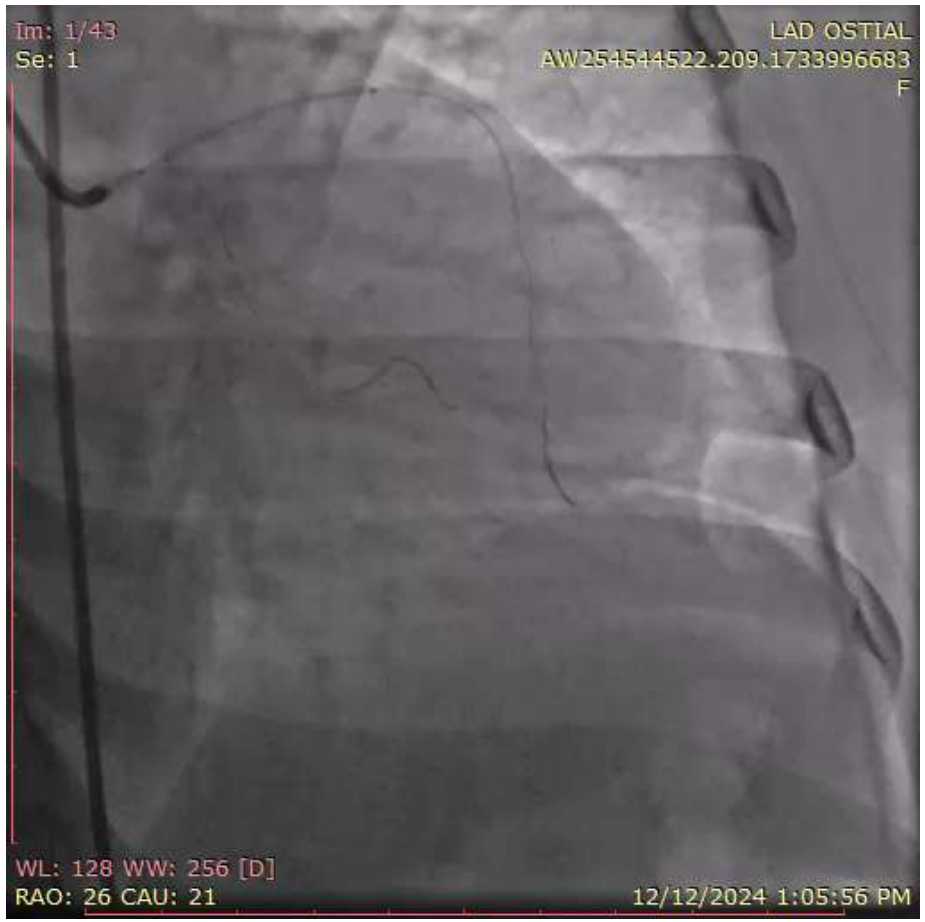
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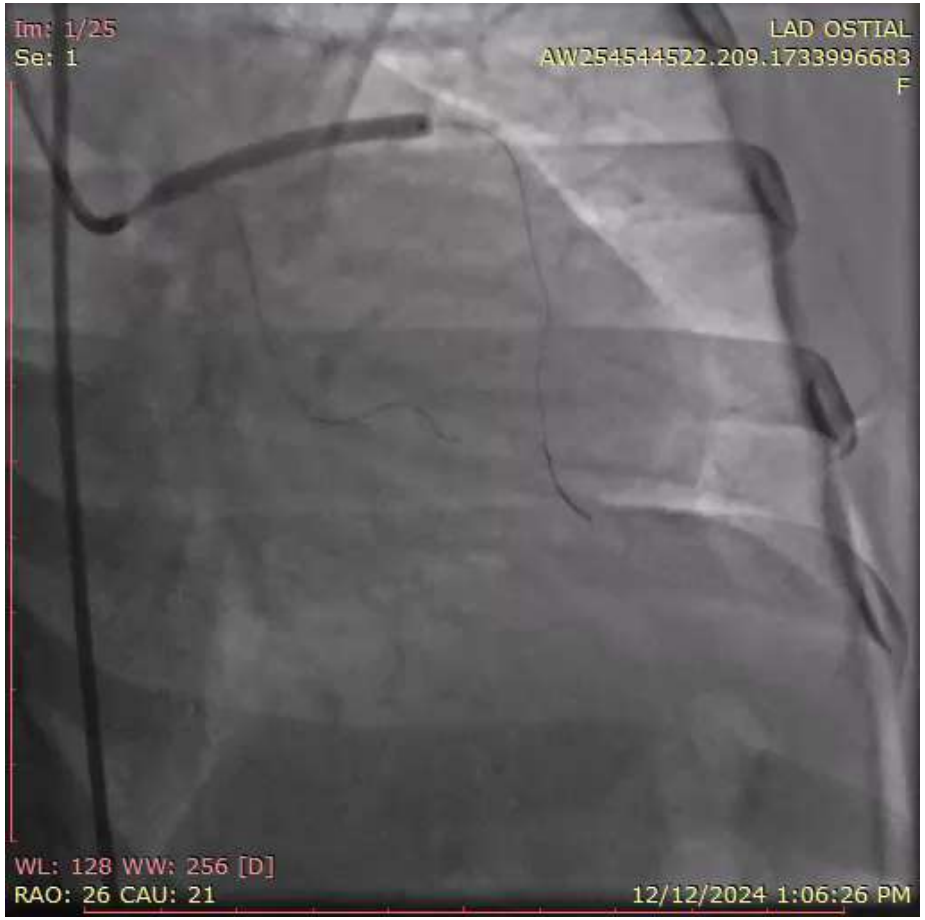
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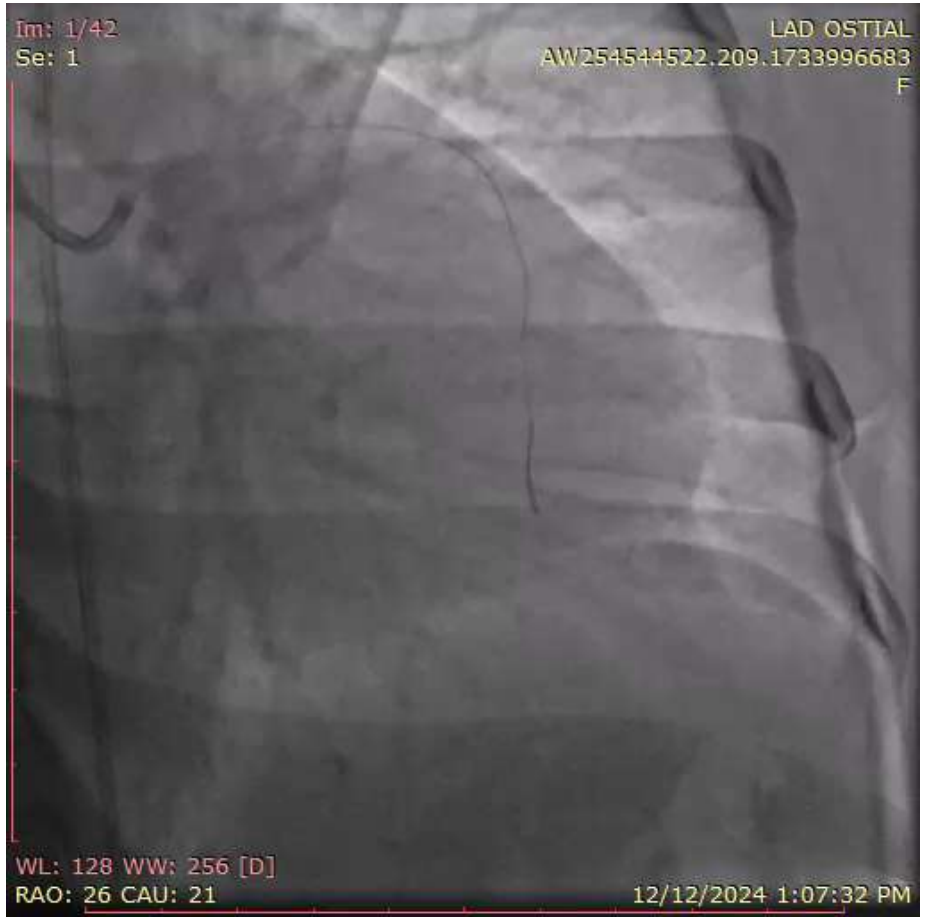
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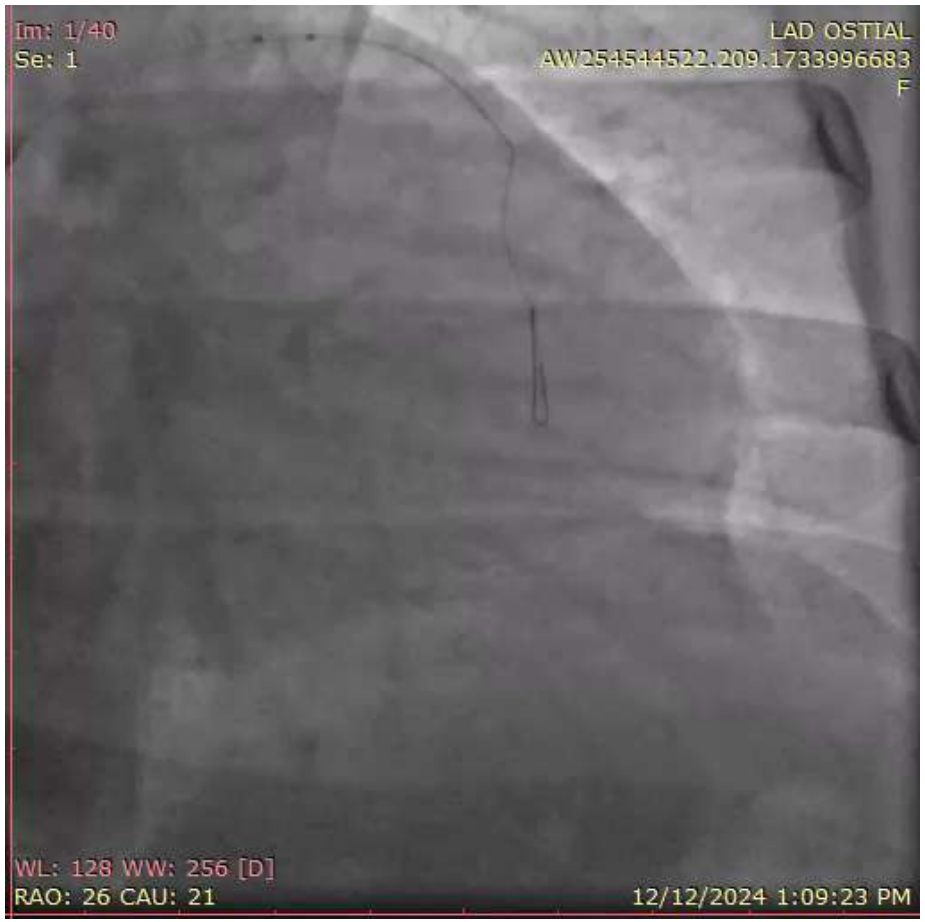
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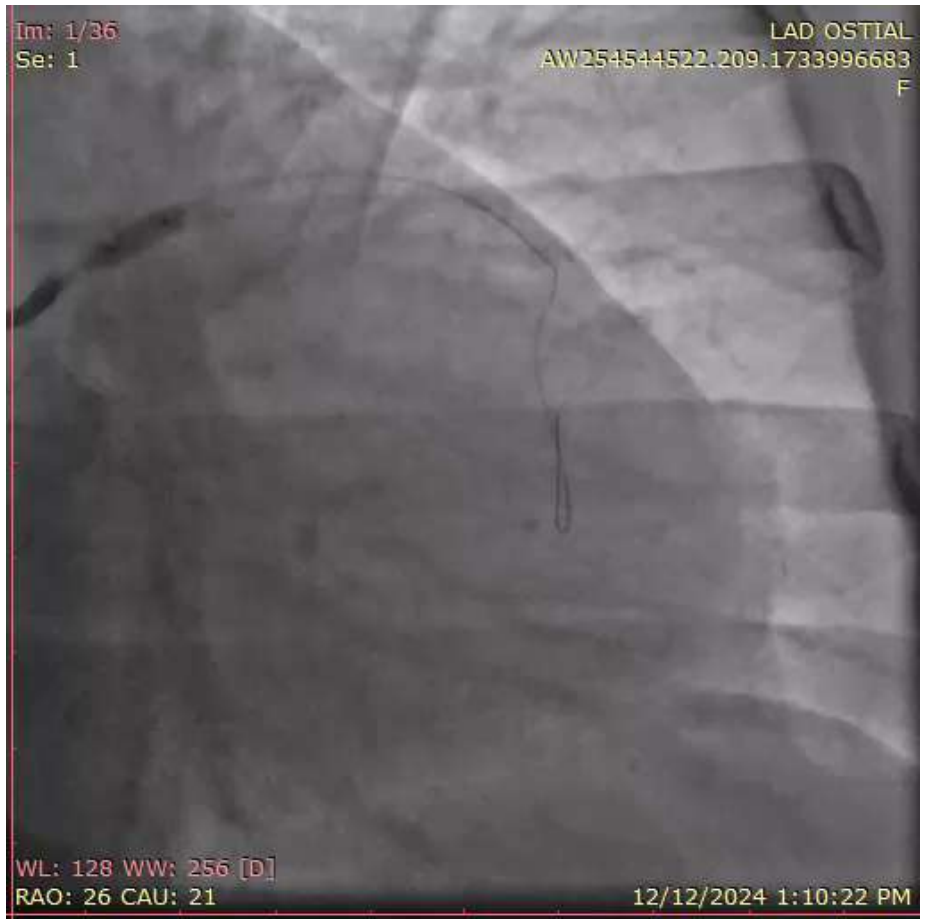
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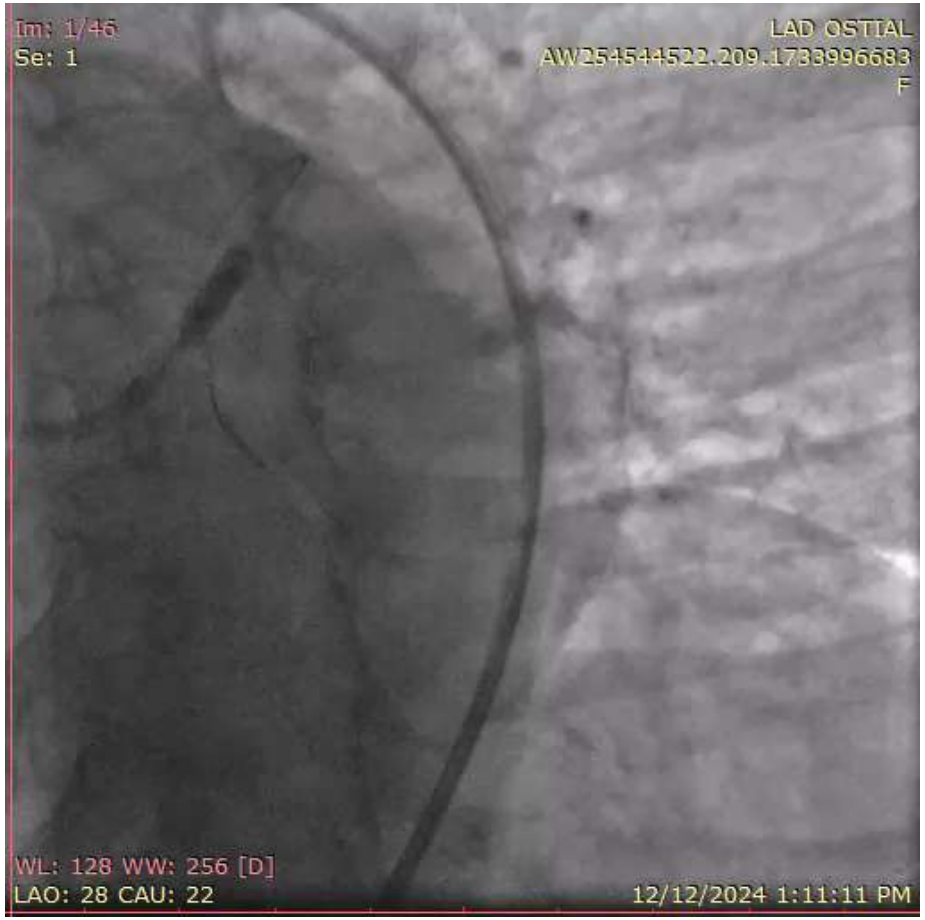
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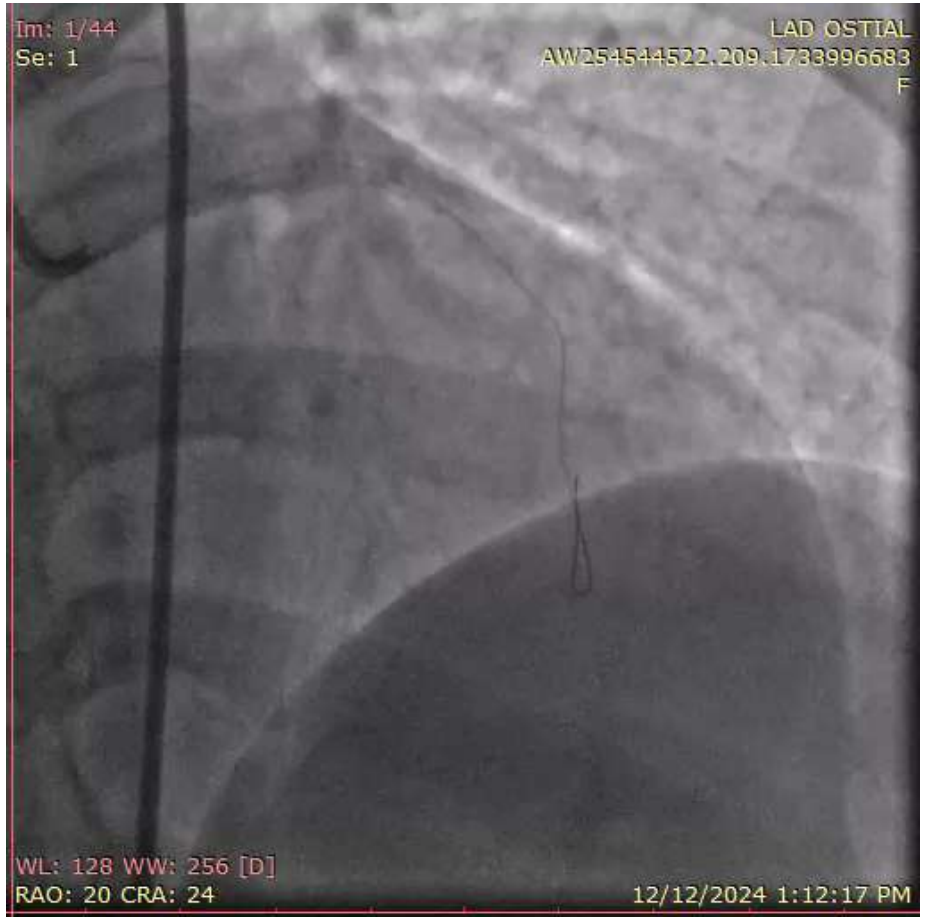
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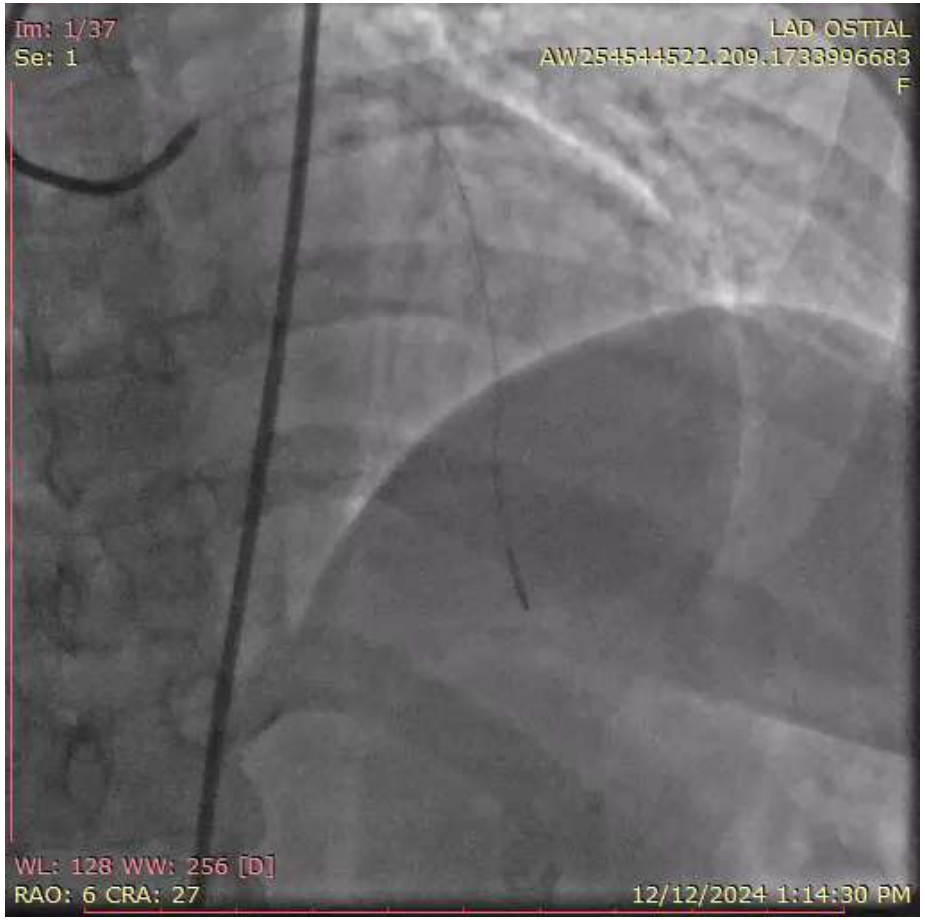
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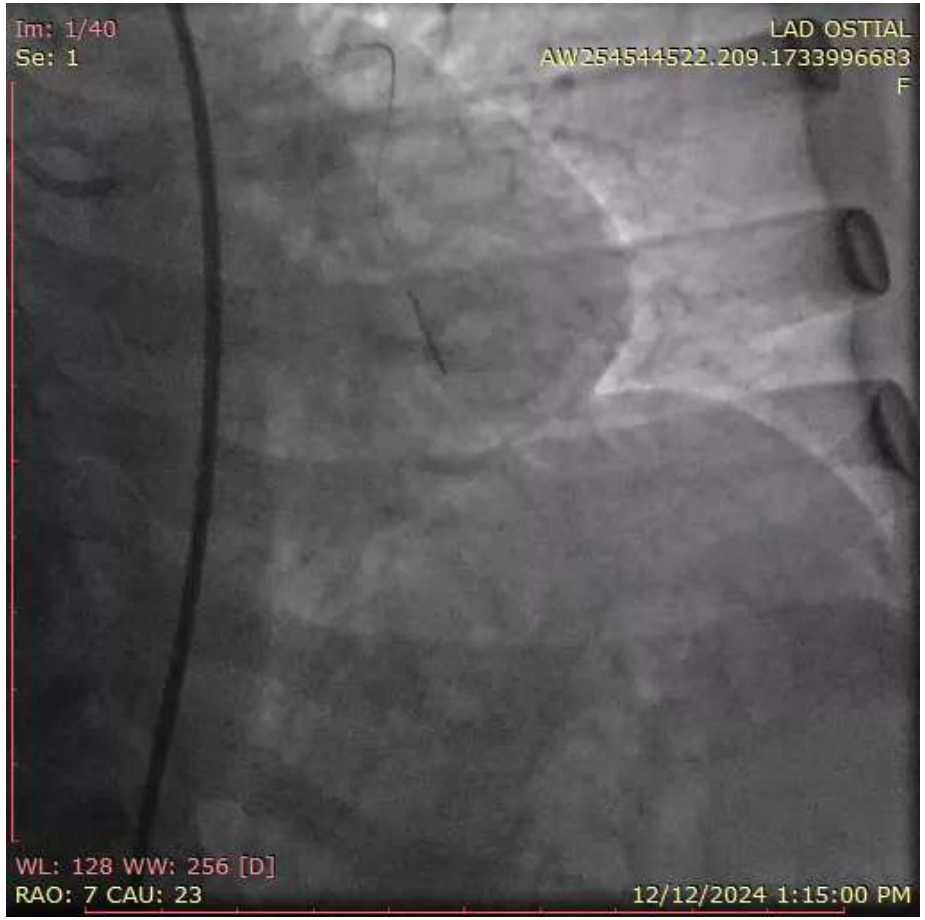
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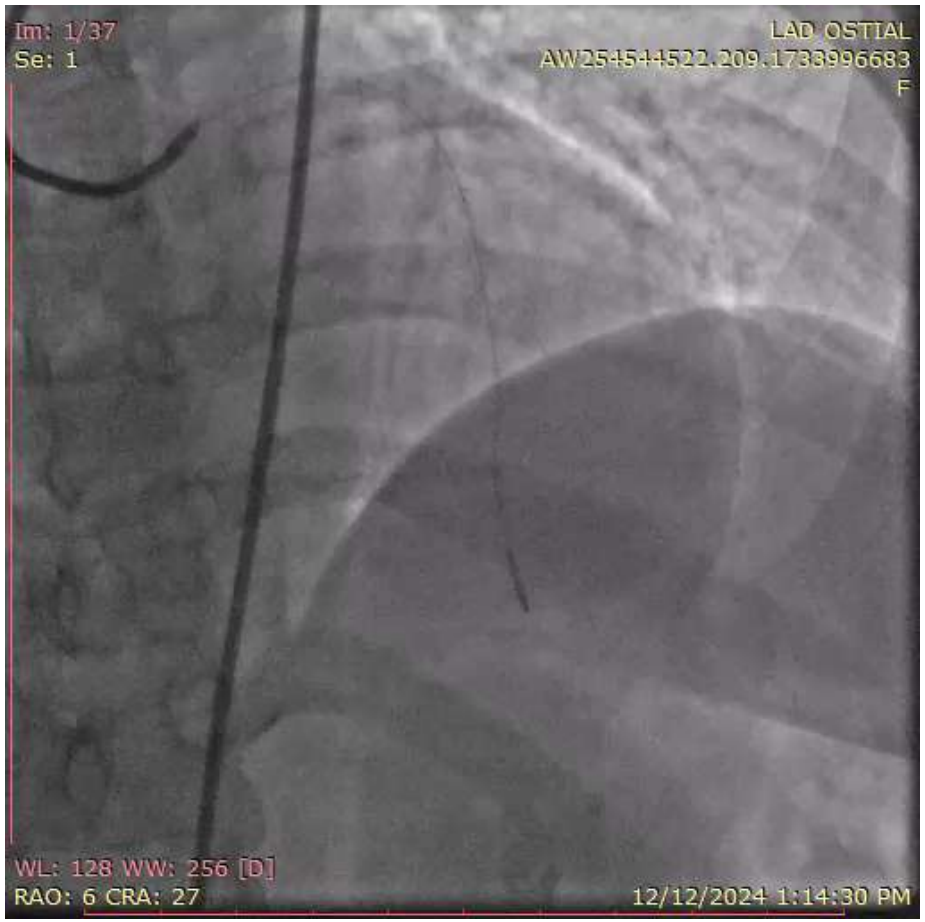
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Key Clinical Trials

DK CRUSH-V Trial :

- Design: Compared DK Crush technique with provisional stenting in distal LM bifurcation lesions.
- Findings: DK Crush showed lower target lesion failure (TLF) rates at 1 year.

EBC MAIN Trial :

- Design: Randomized patients to provisional stenting or systematic dual stenting for true distal LM bifurcations.
- Findings: No significant difference in composite outcomes; provisional stenting had shorter procedure times

DKCRUSH-V Trial Details

- Population: 482 patients with distal LM bifurcation lesions.

- Results: TLF at 1 year was 5.0% in DK Crush group vs. 10.7% in provisional group (P=0.02).

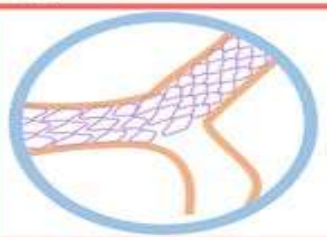
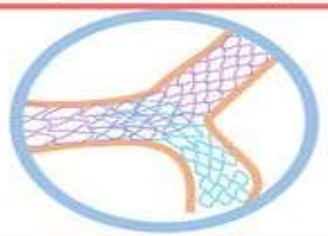
- Conclusion: DK Crush technique superior to provisional stenting in complex LM bifurcations.

The European Bifurcation Club Left Main Coronary Stent study (EBC Main)

EBC Main

Population	Intervention	Control	Outcome	Time
• 467 pts. with distal LM lesion affecting LAD and CX ostia • 7mm mean lesion length and 2.7mm mean reference diameter in the CX (side vessel) assessed by QCA	• Stepwise provisional strategy • 89% KBI after 1st stent • 22% finished with 2nd stent (11% TAP, 11% Culotte)	• Upfront 2-stent strategy • Culotte 53%, TAP 33%, DK-Crush 5% • 93% final KBI	• Composite of death, MI or TLR 14.7% (provisional) vs. 17.7% (upfront 2-stent), p=0.34 • TLR 6.1% vs. 9.3%, p=0.16	• 12-month follow-up for all endpoints

Real world needs

All-comer true distal LM bifurcation lesions	Procedural success with widely applicable and clear stepwise technique		Efficacy with maintained safety	Long-term survival
			RESTENOSIS THROMBOSIS	5 10 15 years

EBC MAIN Trial Details

- Population: 467 patients with true distal LM bifurcation lesions (MEDINA 1,1,1 or 0,1,1)

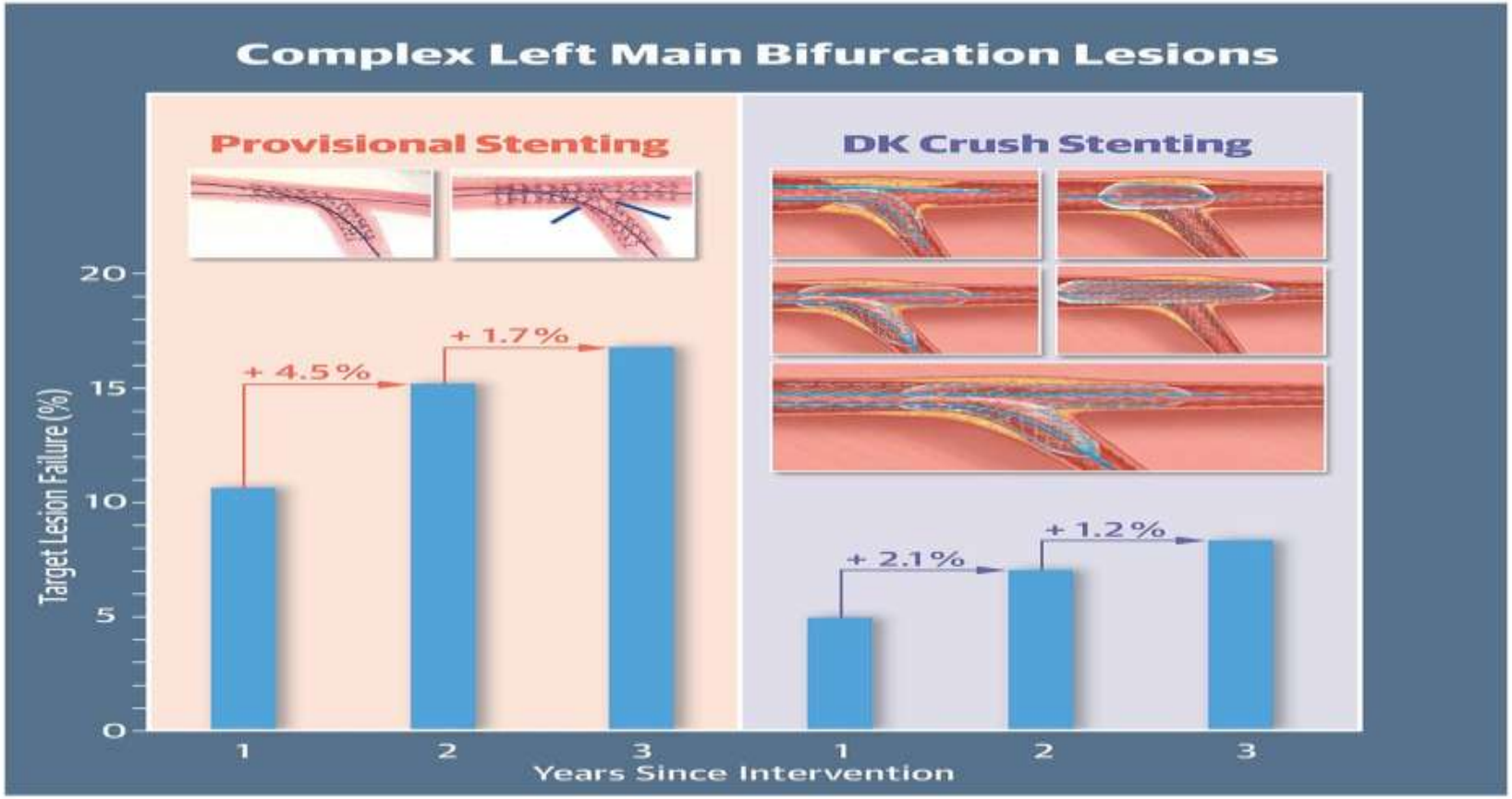
- Results: Primary endpoint occurred in 14.7% (provisional) vs. 17.7% (dual stent); no significant difference (P=0.34).

- Conclusion: Provisional stenting should remain the default strategy for distal LM bifurcation interventions.

WHY ARE THE RESULTS ARE SO DIFFERENT ?

1) The definitions in the studies were different. The DKCRUSH-V study used cardiac death and target vessel-related myocardial infarction rather than death and myocardial infarction and this will have reduced the overall number of events.

CENTRAL ILLUSTRATION: Chronological Increase in Target Lesion Failure After Provisional and DK Crush Stenting



Chen, X. et al. J Am Coll Cardiol Intv. 2019;12(19):1927–37.

WHY ARE THE RESULTS ARE SO DIFFERENT ?

2) The coronary anatomy was different.

The respective SYNTAX scores were 31 (DK crush) vs. 23 (EBC MAIN) and the side-vessel lesion lengths were 16 mm (DK crush) vs. 7 mm (EBC MAIN—although the measurement methodology may have differed between the studies).

Therefore, the extent of disease was greater in the DKCRUSH-V study and indeed 45% of patients in the provisional group had implantation of two stents vs. 22% in EBC MAIN.

Clinical Implications

- Provisional Stenting: Preferred for simple bifurcations with non-diseased or small side branches.

- Upfront Two-Stent Strategy: Consider for complex bifurcations with significant side branch involvement.

- Decision-Making: Tailor strategy based on lesion complexity, patient anatomy, and operator expertise.

Guidelines and Recommendations

- Guidelines and Recommendations

- ESC/EACTS Guidelines: Highlight recommendations favoring provisional stenting as default, with two-stent strategies for complex lesions.

- Operator Considerations: Emphasize importance of experience and use of intravascular imaging.

Future Directions

- Research: Ongoing trials comparing stenting strategies with newer technologies.

- Technological Advances: Role of drug-coated balloons, bioresorbable scaffolds, and advanced imaging in bifurcation PCI.

Conclusion

- Summary: Both provisional and upfront two-stent strategies have roles in LM bifurcation management.

- Key Takeaway ! Strategy selection should be individualized based on lesion complexity and patient-specific factors.

Thank you for your attention !