LUNCH SYMPOSIUM CORDIS. Go Beyond Metal: Exploring Drug-Eluting Balloon technology in de-novo coronary lesions

Understand the concepts, techniques, and devices to achieve optimal vessel preparation for the perfect DEB outcome-DEB technology in de novo coronary lesions

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Wednesday, August 7th, 2024 – 12h35 às 12h50 (15 minutos)
Room Buen Ayre A – Hilton Hotel Convention Center
Buenos Aires, Argentina

DCB in *De Novo* Lesions

- Concepts
- Techniques
- Technologies
- Lesion selection
- Optimal vessel preparation
- Recent clinical evidence
- Recommendations

DCB in *De Novo* Lesions

- **Concepts**

Why DCB?

- Leave “nothing behind concept”
- Avoid problems related to short and long-term presence of stents
- Preserve vessel motricity and physiology
- Avoid continuous vessel inflammation
- Uncage the coronary tree segments
- Alternative for patients with restriction for DAPT

DCB in *De Novo* Lesions

- Concepts
- **Techniques**

DCB Consensus Document

JACC: CARDIOVASCULAR INTERVENTIONS VOL. 13, NO. 12, 2020

STATE-OF-THE-ART REVIEW

Drug-Coated Balloons for Coronary Artery Disease

Third Report of the International DCB Consensus Group

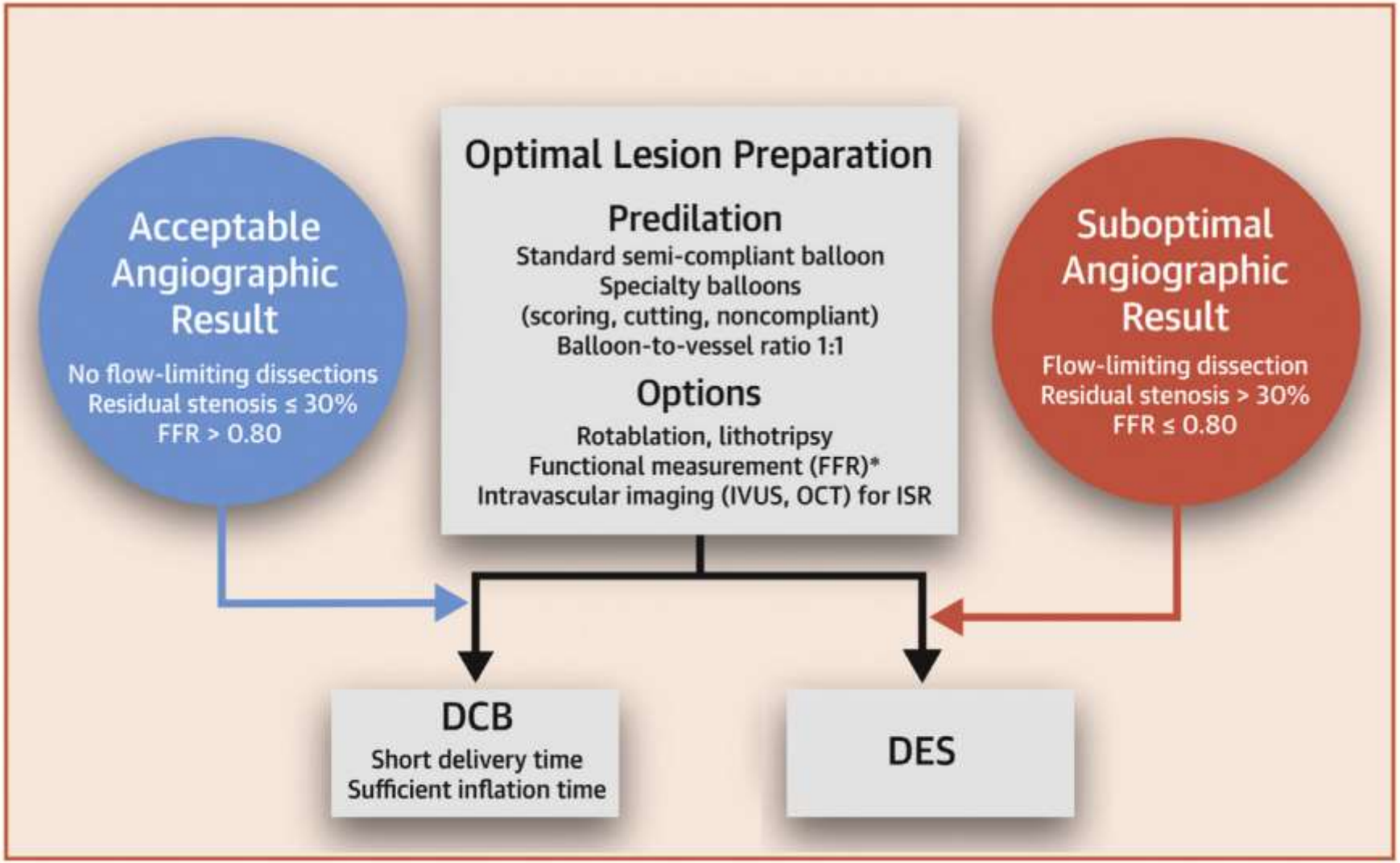
Raban V. Jeger, MD,[a] Simon Eccleshall, MD,[b] Wan Azman Wan Ahmad, MD,[c] Junbo Ge, MD,[d] Tudor C. Poerner, MD,[e] Eun-Seok Shin, MD,[f] Fernando Alfonso, MD,[g] Azeem Latib, MD,[h] Paul J. Ong, MD,[i] Tuomas T. Rissanen, MD,[j] Jorge Saucedo, MD,[k] Bruno Scheller, MD,[l] Franz X. Kleber, MD,[m] for the International DCB Consensus Group

ABSTRACT

Although drug-eluting stents are still the default interventional treatment of coronary artery disease, drug-coated balloons (DCBs) represent a novel alternative therapeutic strategy in certain anatomic conditions. The effect of DCBs is based on the fast and homogenous transfer of antiproliferative drugs into the vessel wall during single balloon inflation by means of a lipophilic matrix without the use of permanent implants. Although their use is established for in-stent restenosis of both bare-metal and drug-eluting stents, recent randomized clinical data demonstrate a good efficacy and safety profile in de novo small-vessel disease and high bleeding risk. In addition, there are other emerging indications (e.g., bifurcation lesions, large-vessel disease, diabetes mellitus, acute coronary syndromes). Because the interaction among the different delivery balloon designs, doses, formulations, and release kinetics of the drugs used is important, there seems to be no "class effect" of DCBs. On the basis of the amount of recently published data, the International DCB Consensus Group provides this update of previous recommendations summarizing the historical background, technical considerations such as choice of device and implantation technique, possible indications, and future perspectives. (J Am Coll Cardiol Intv 2020;13:1391–402) © 2020 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Jeger RV, et al. J Am Coll Cardiol Intv. 2020;13:1391-402

Optimized Technique

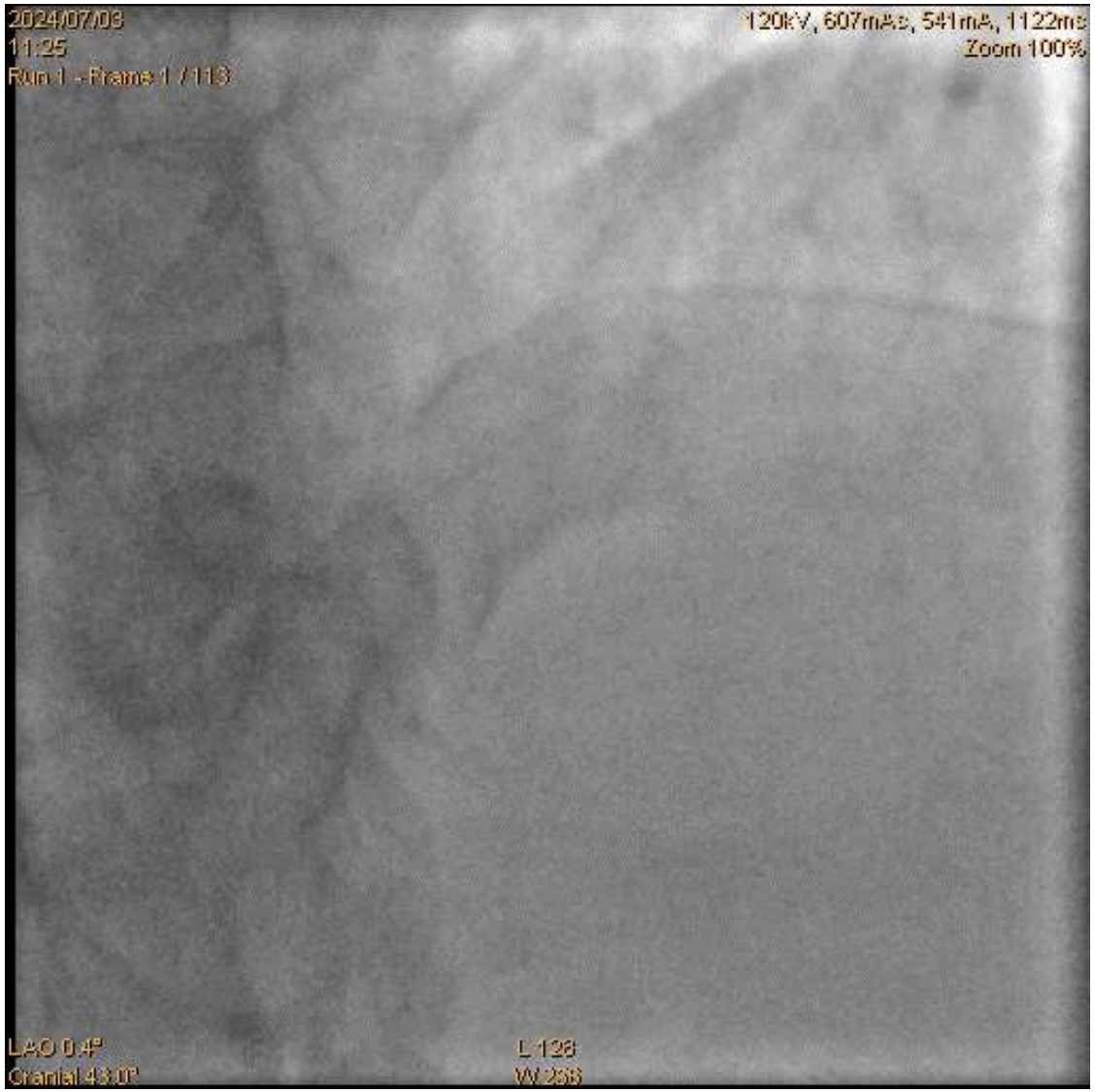


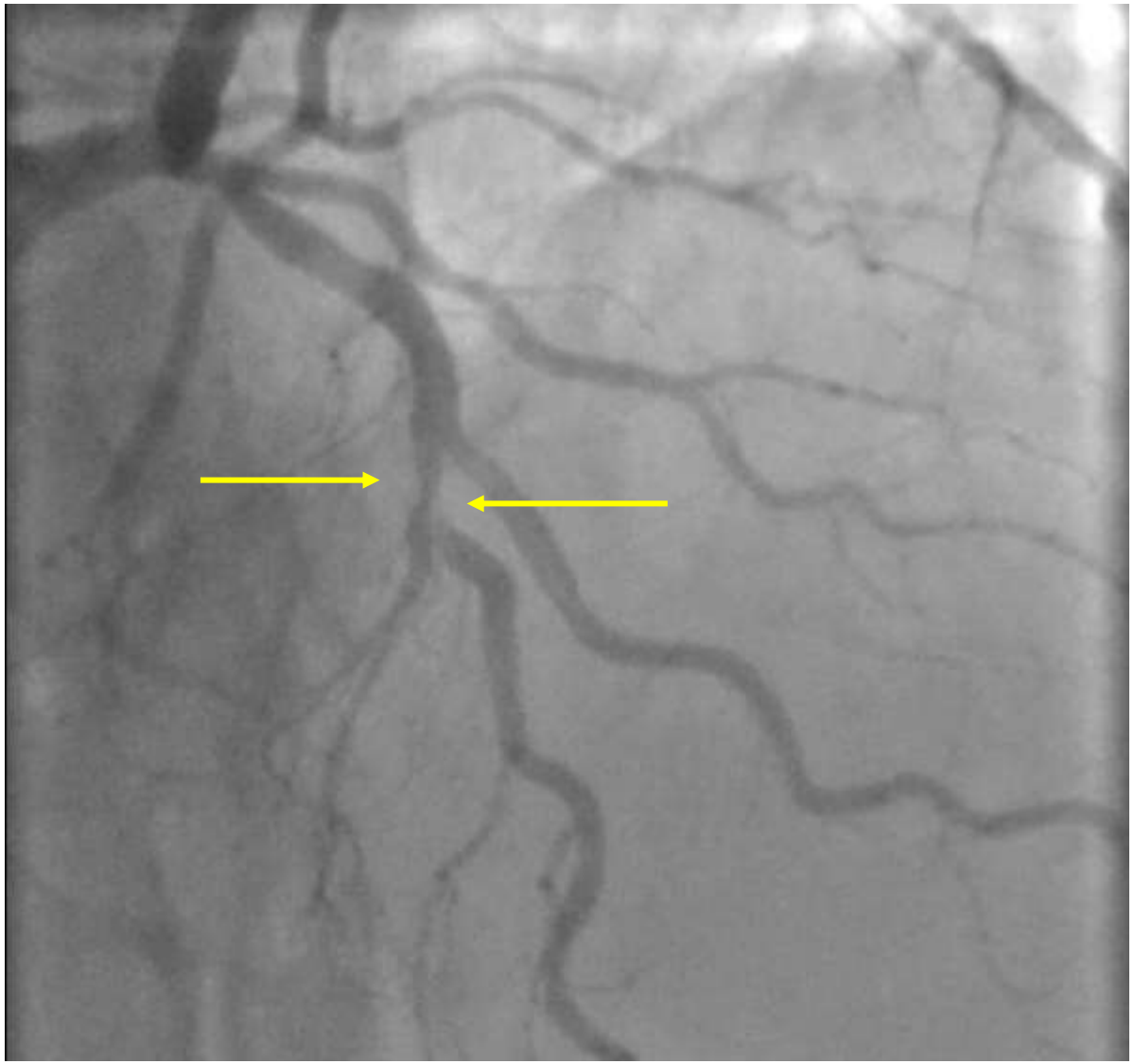
Jeger RV, et al. J Am Coll Cardiol Intv. 2020;13:1391-402

Examples

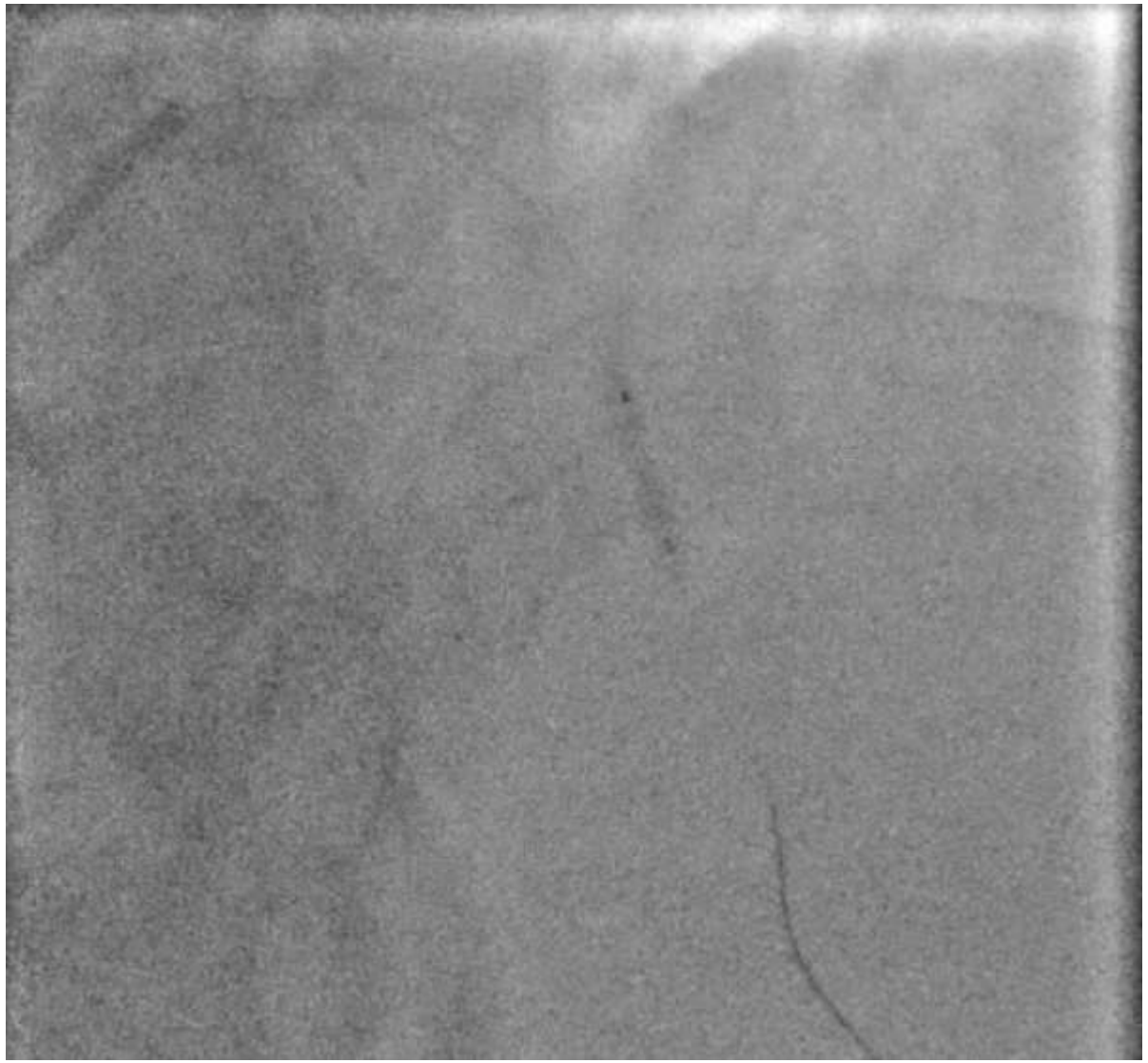
Mid LAD Lesion

Preprocedure Angio

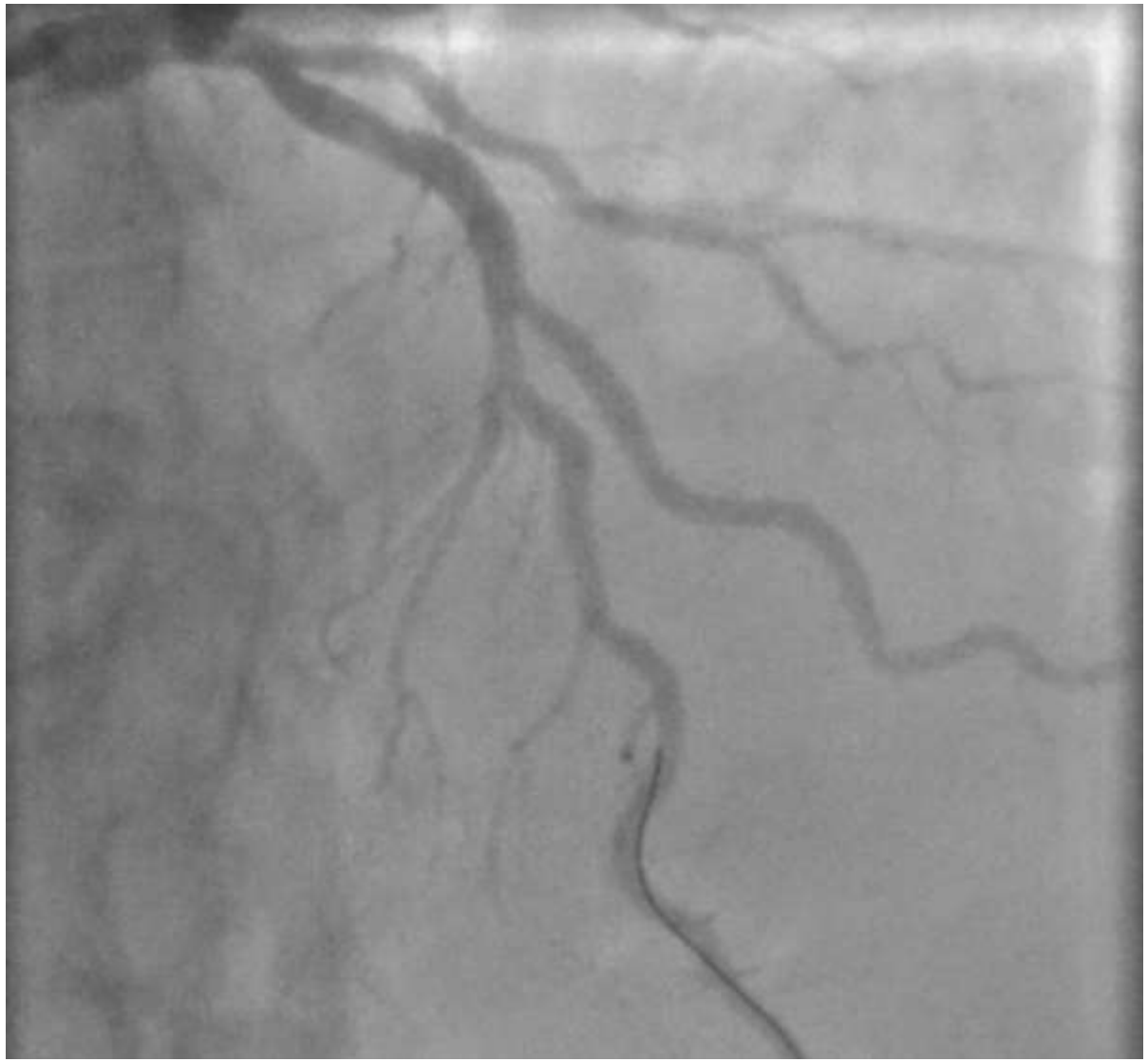




Lesion Preparation and Control

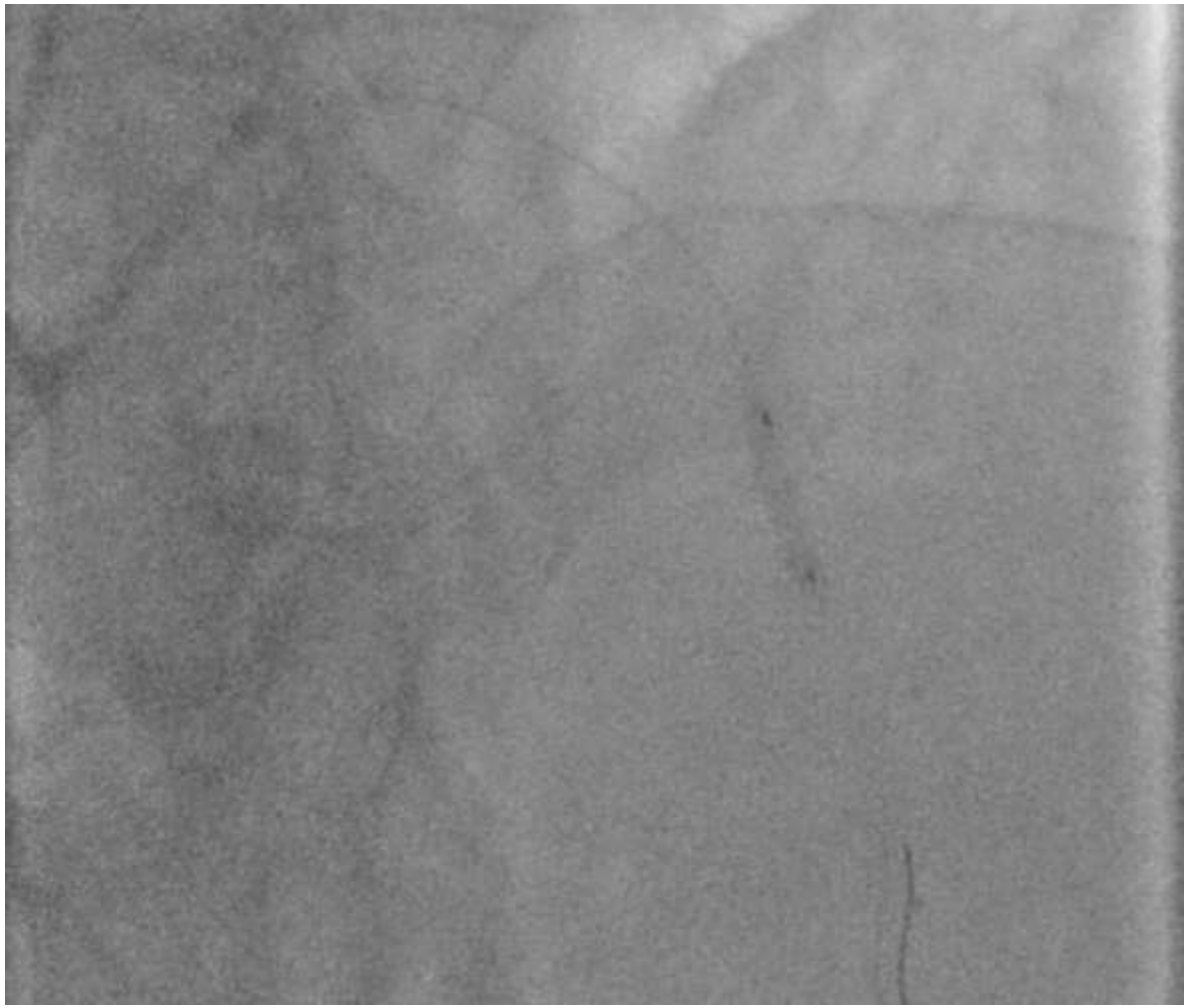


Balloon predilations (NC 3.0 x 12 mm and 3.25 x 12)

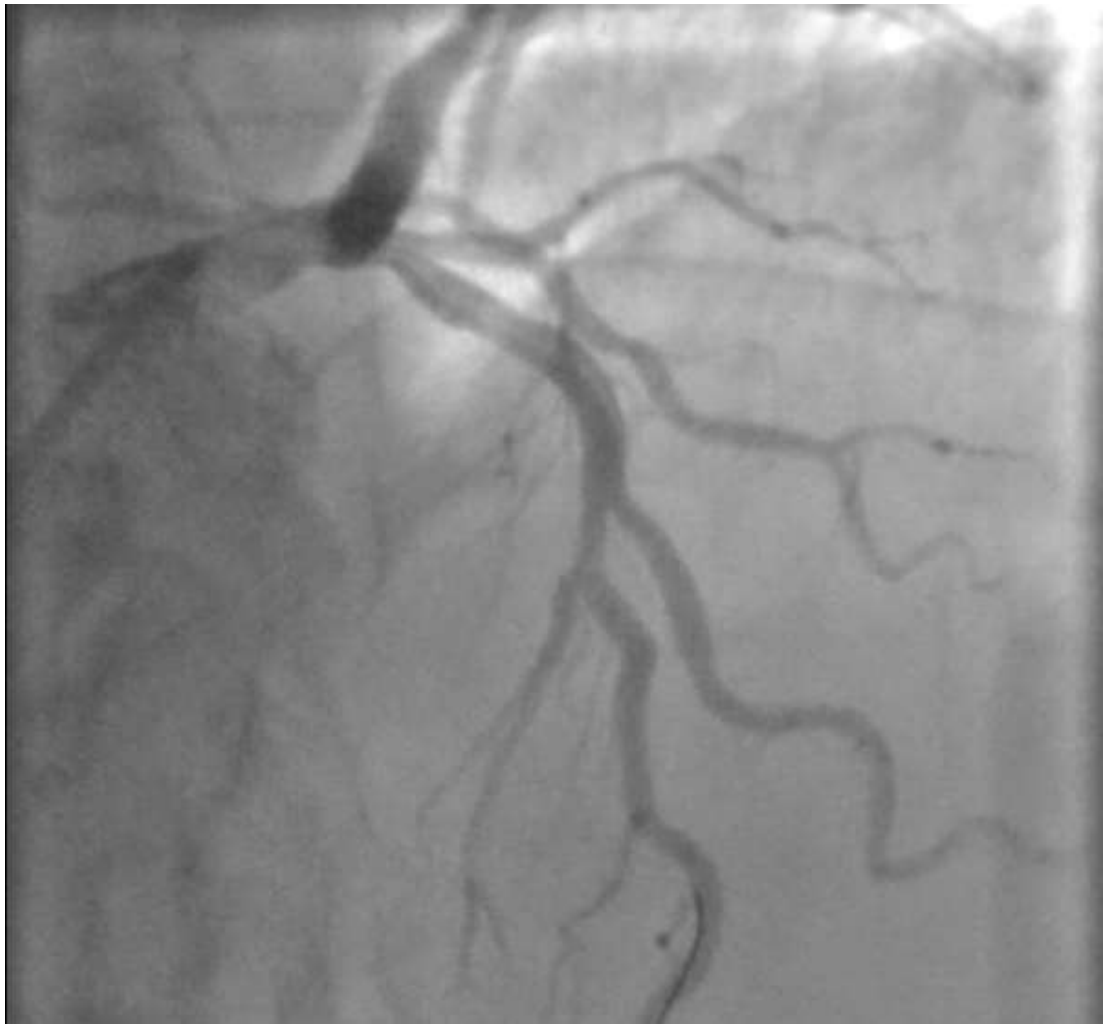


Control

DCB and Control after 10 min.

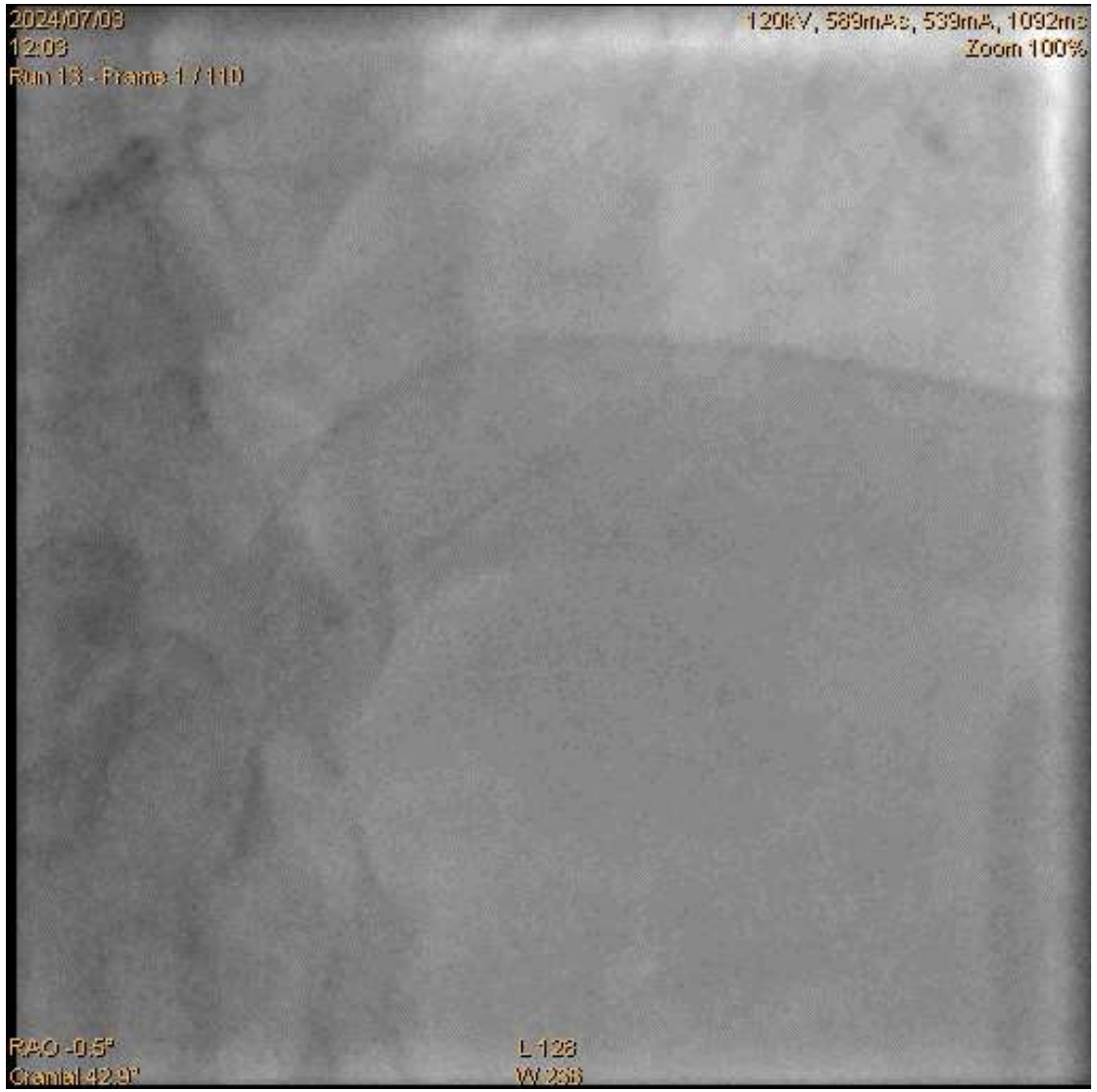


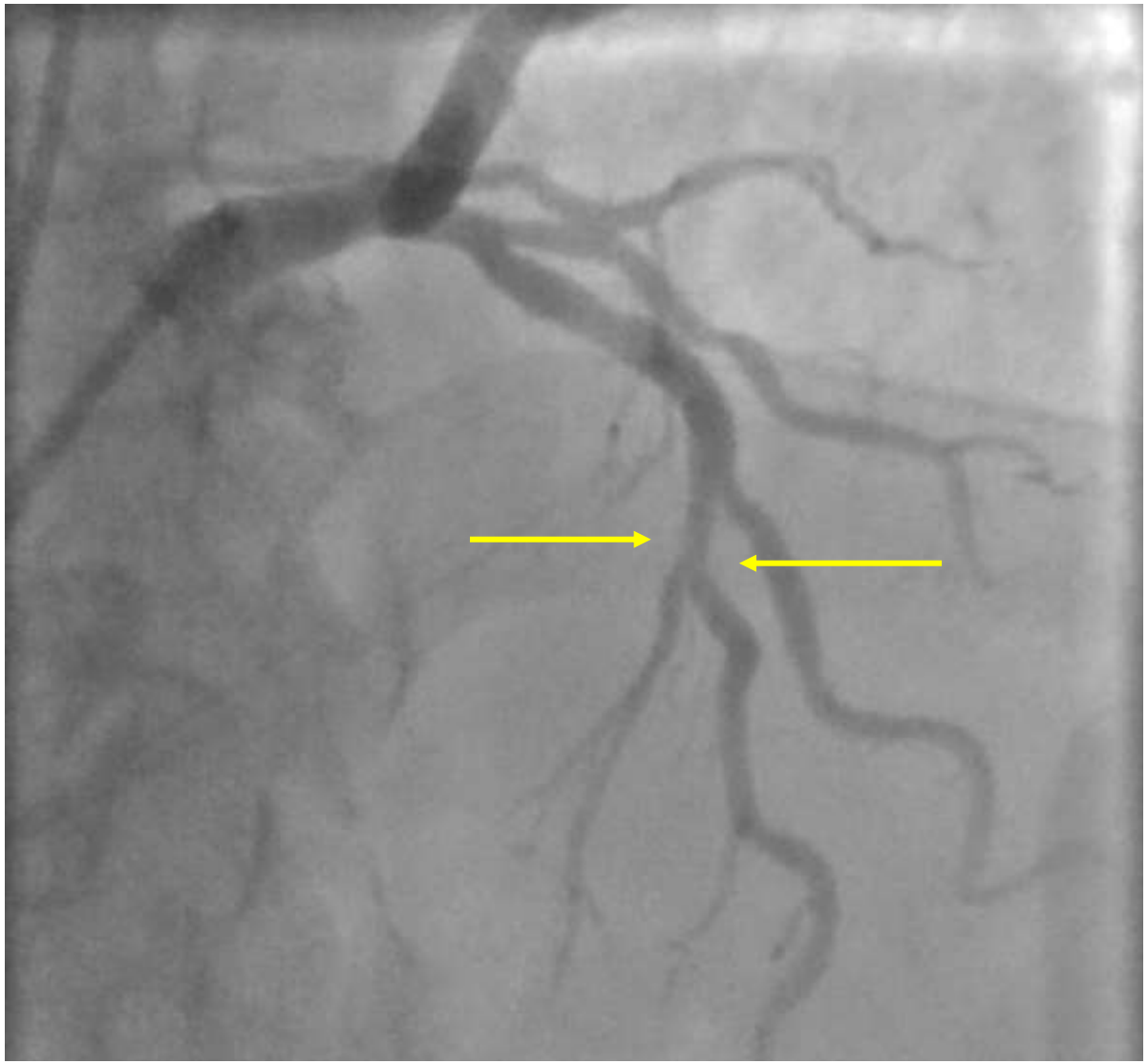
DCB 3.0 x 15 mm



Control

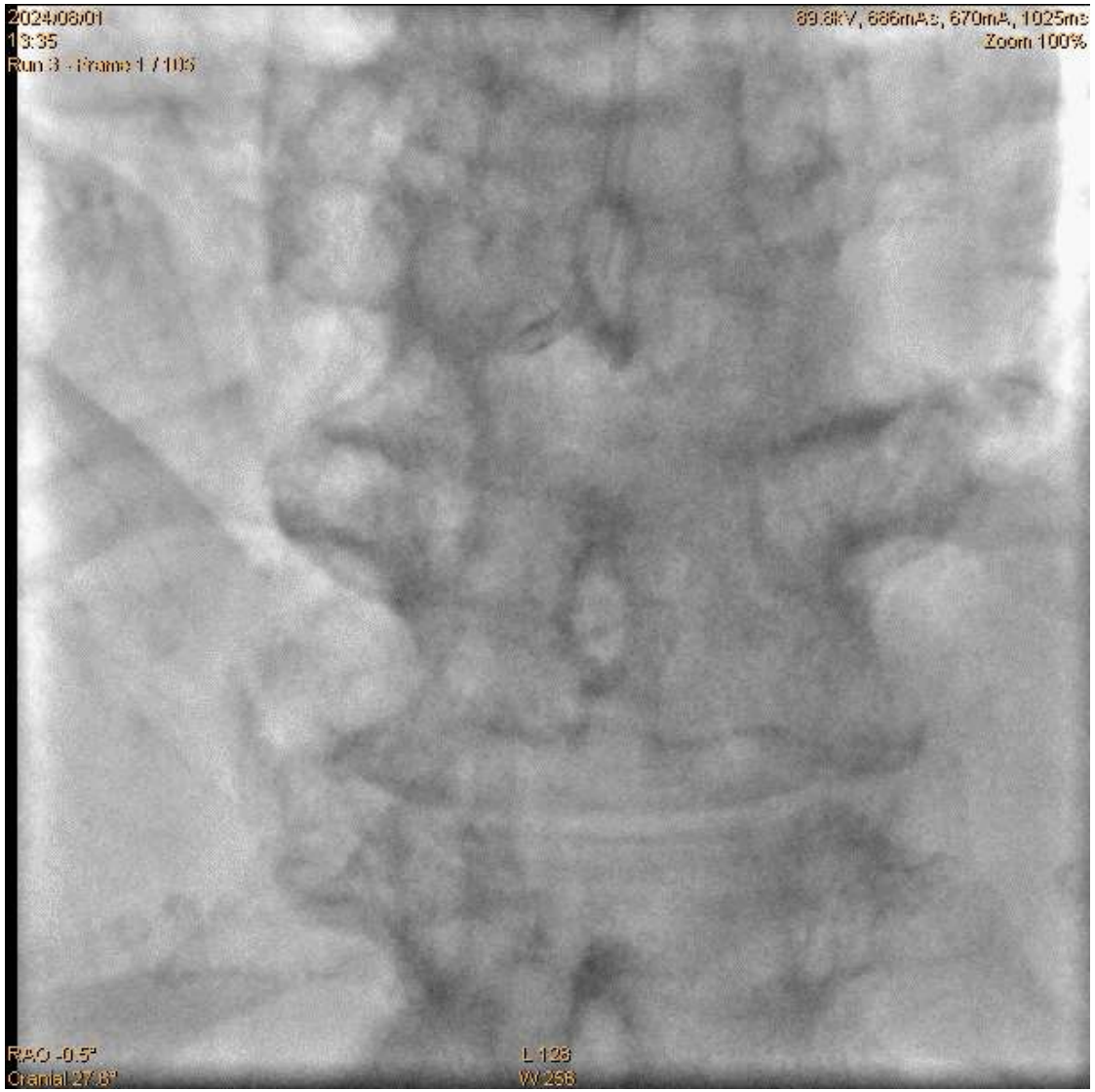
Final Angiographic Result

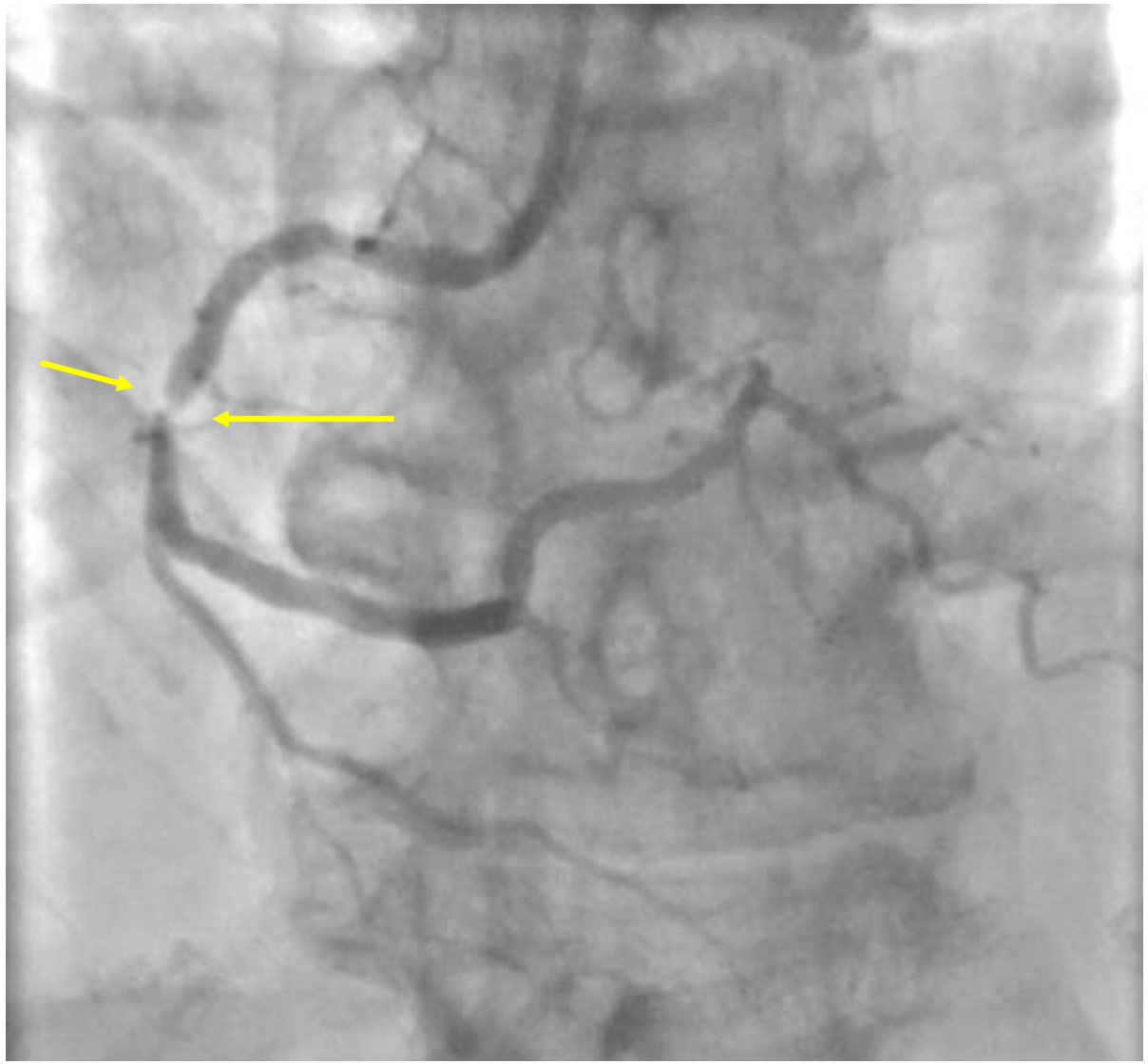




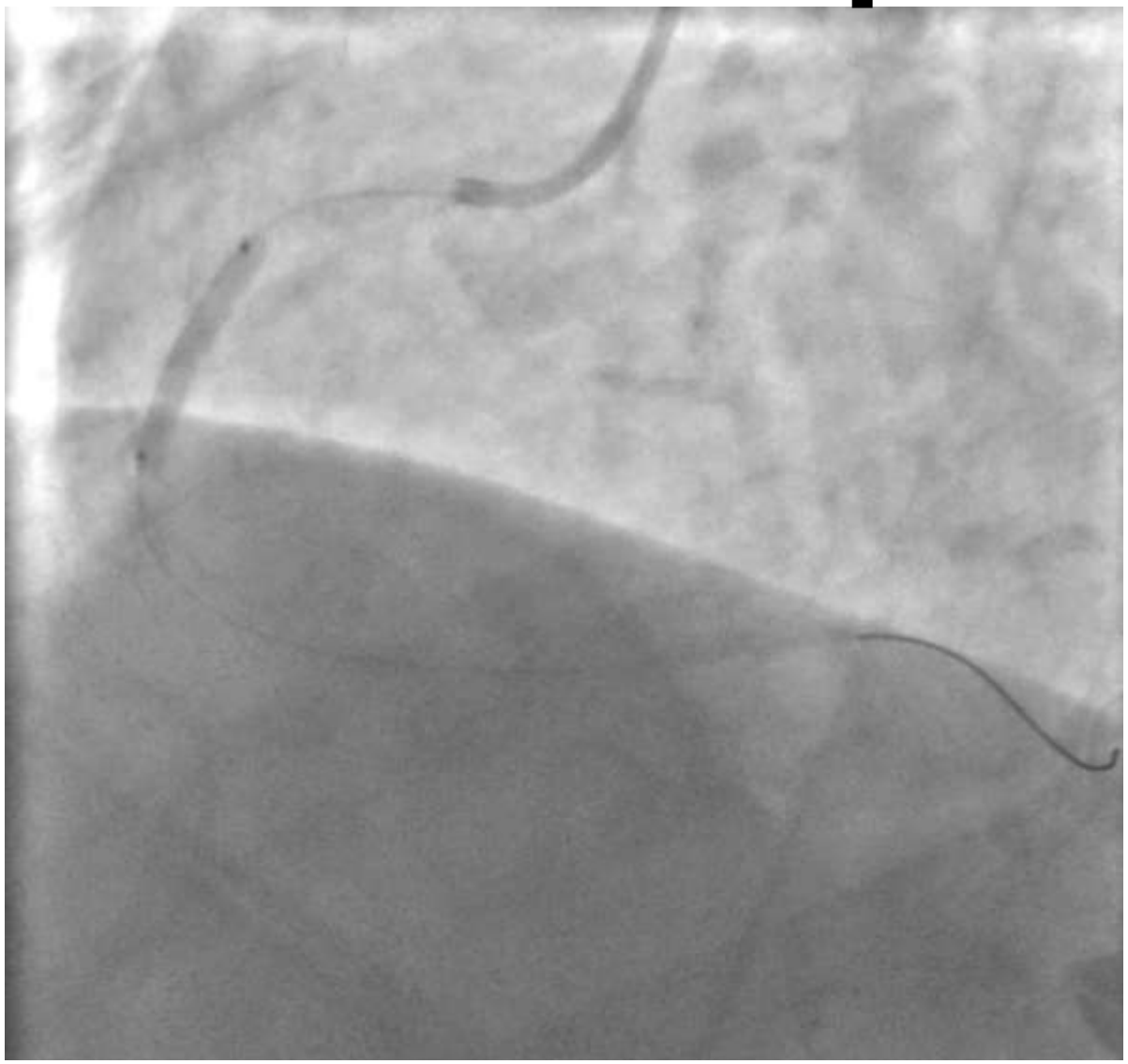
Mid Dominant RCA Lesion

Preprocedure Angio

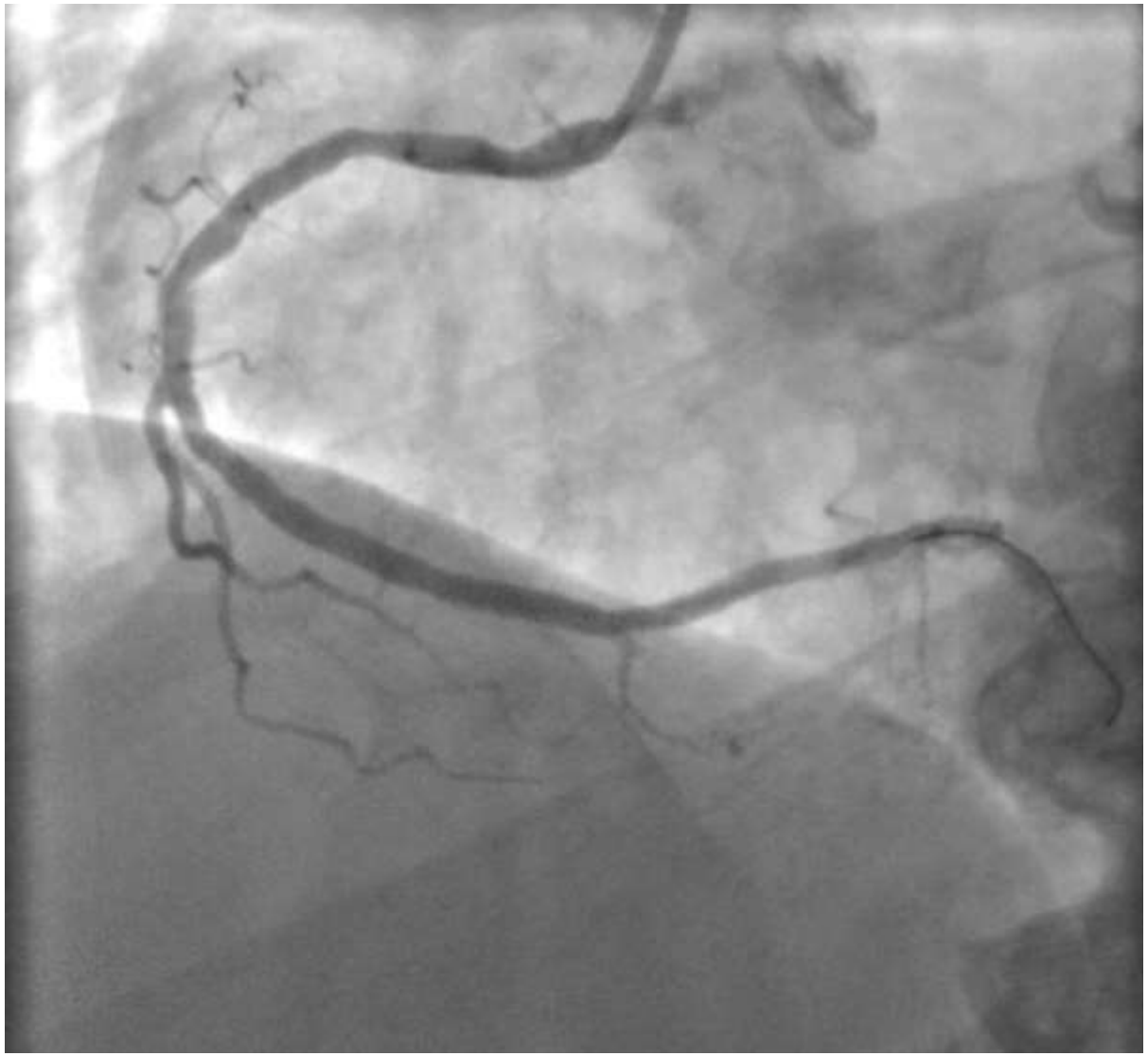




Lesion Preparation and Control

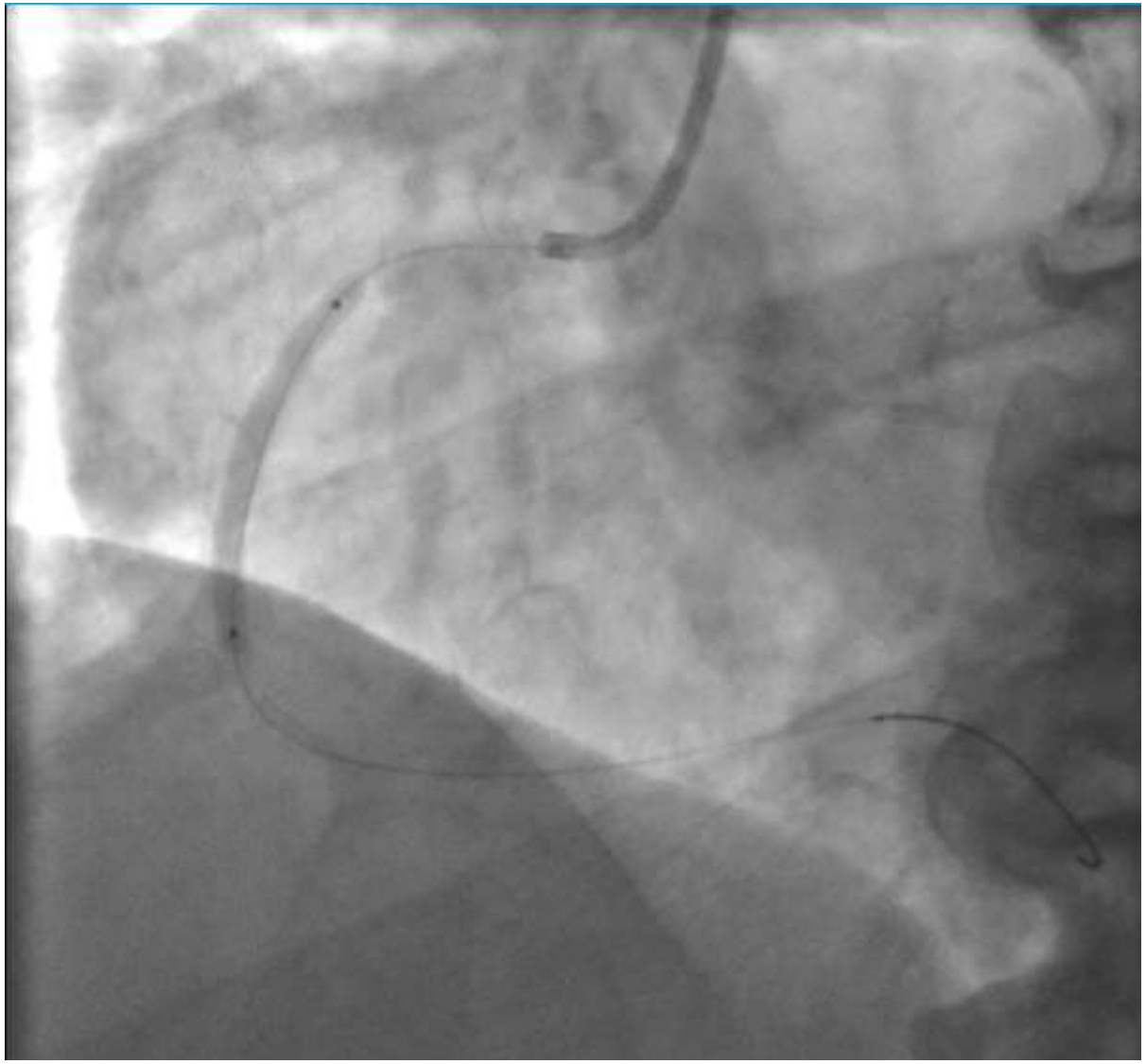


Balloon predilation NC 3.25 x 20 mm

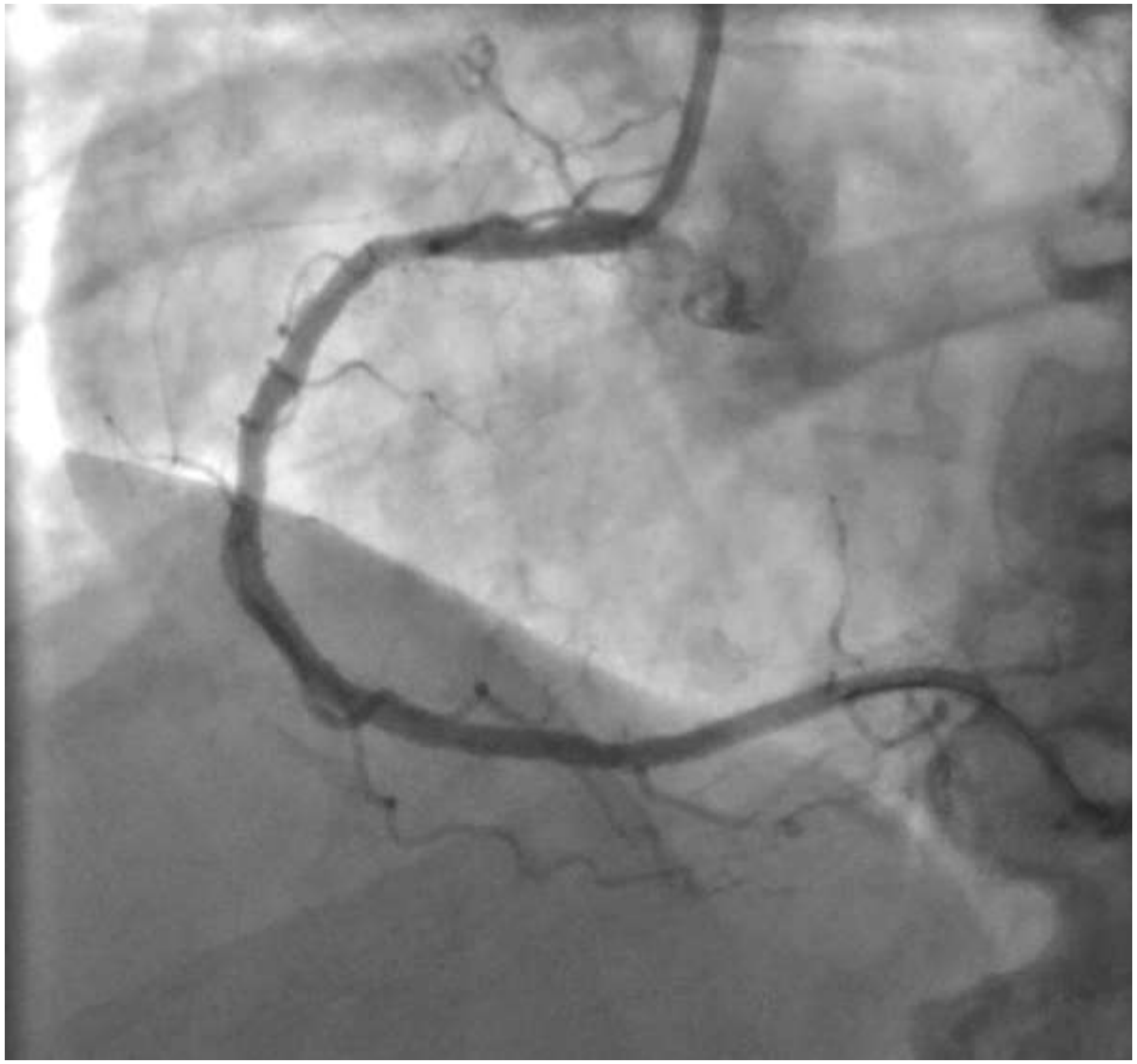


Control

DCB and Control after 20 min.

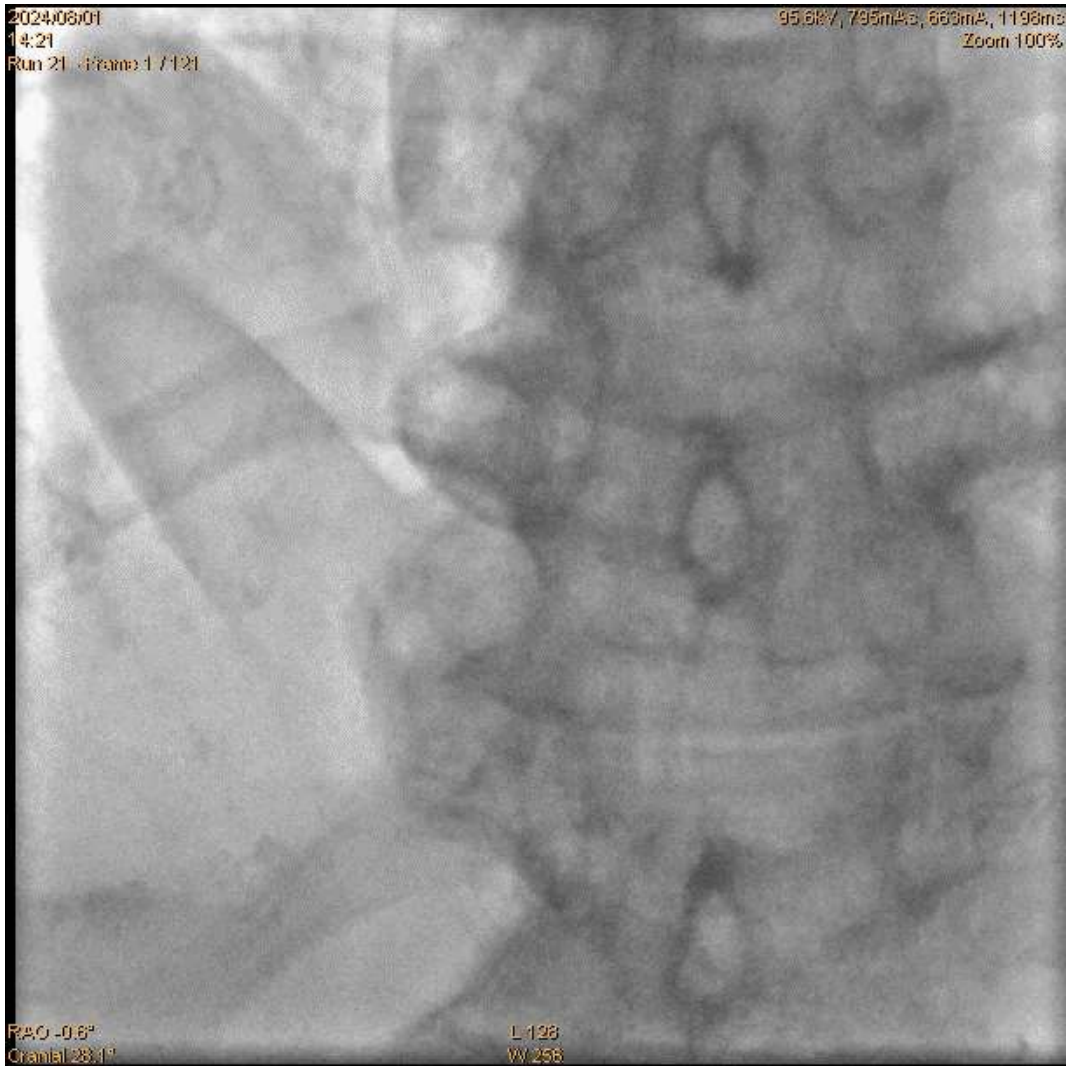


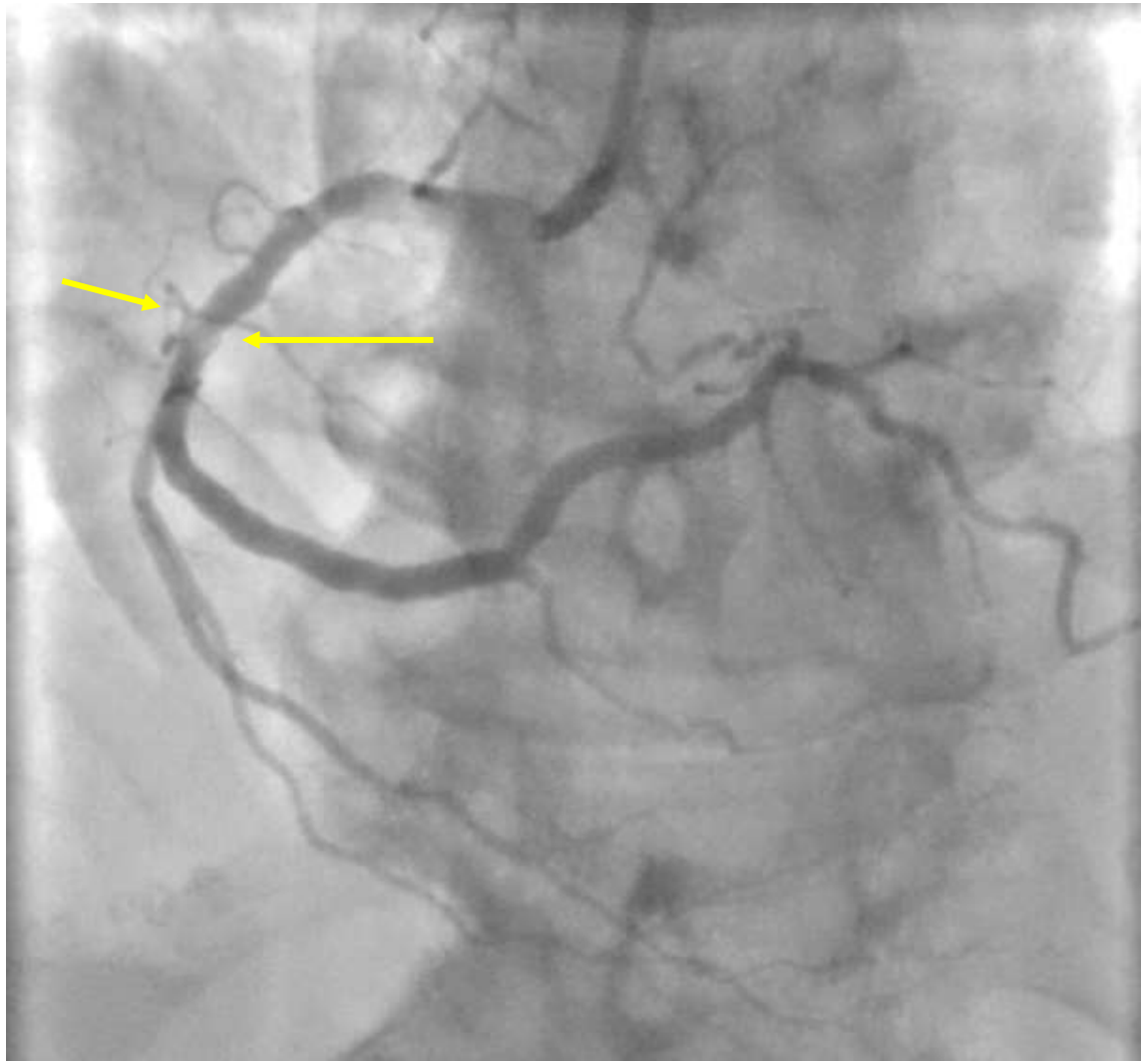
DCB 3.0 x 30 mm



Control

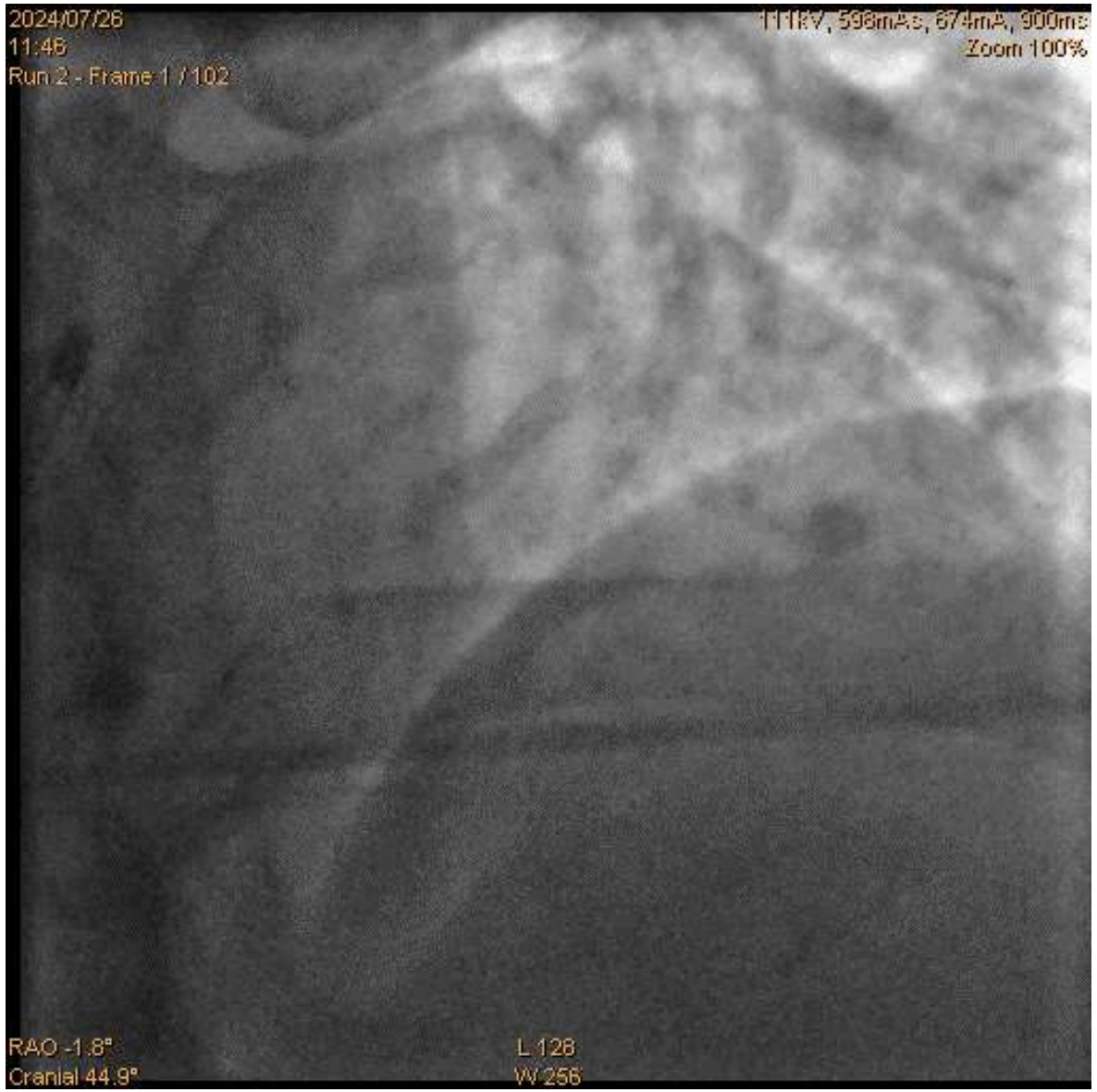
Final Angiographic Result

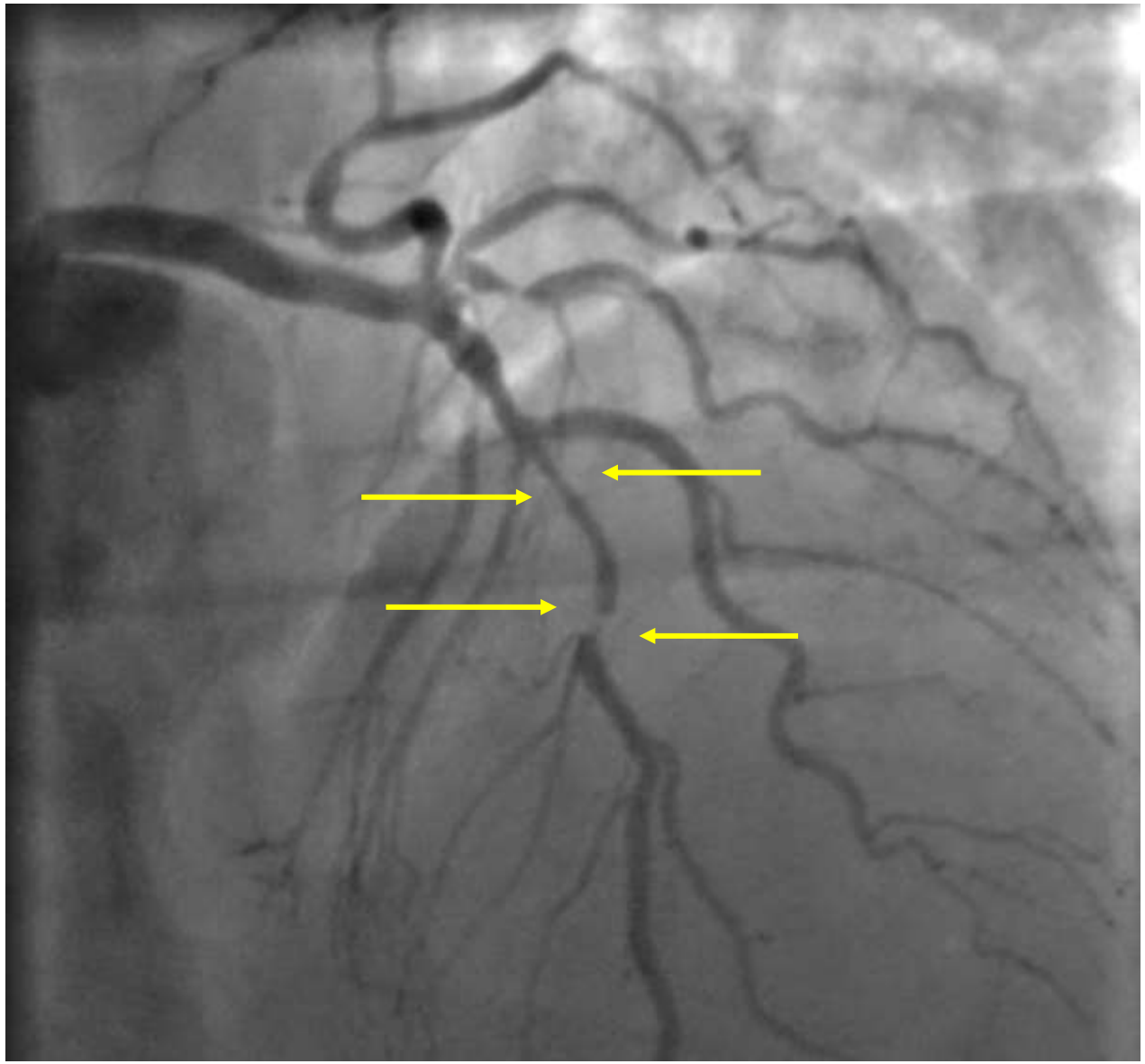




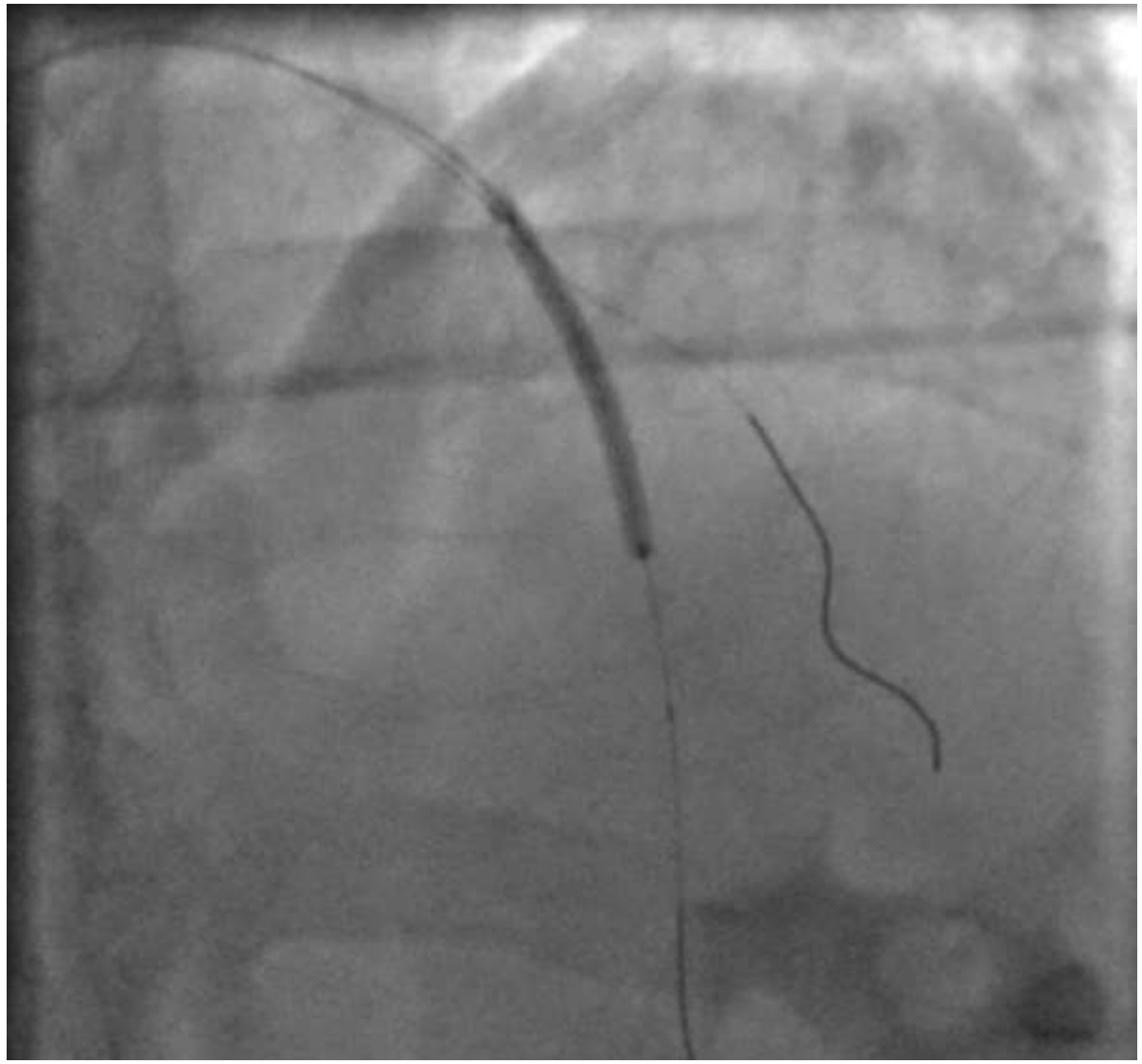
Provisional Stenting

Preprocedure Angio

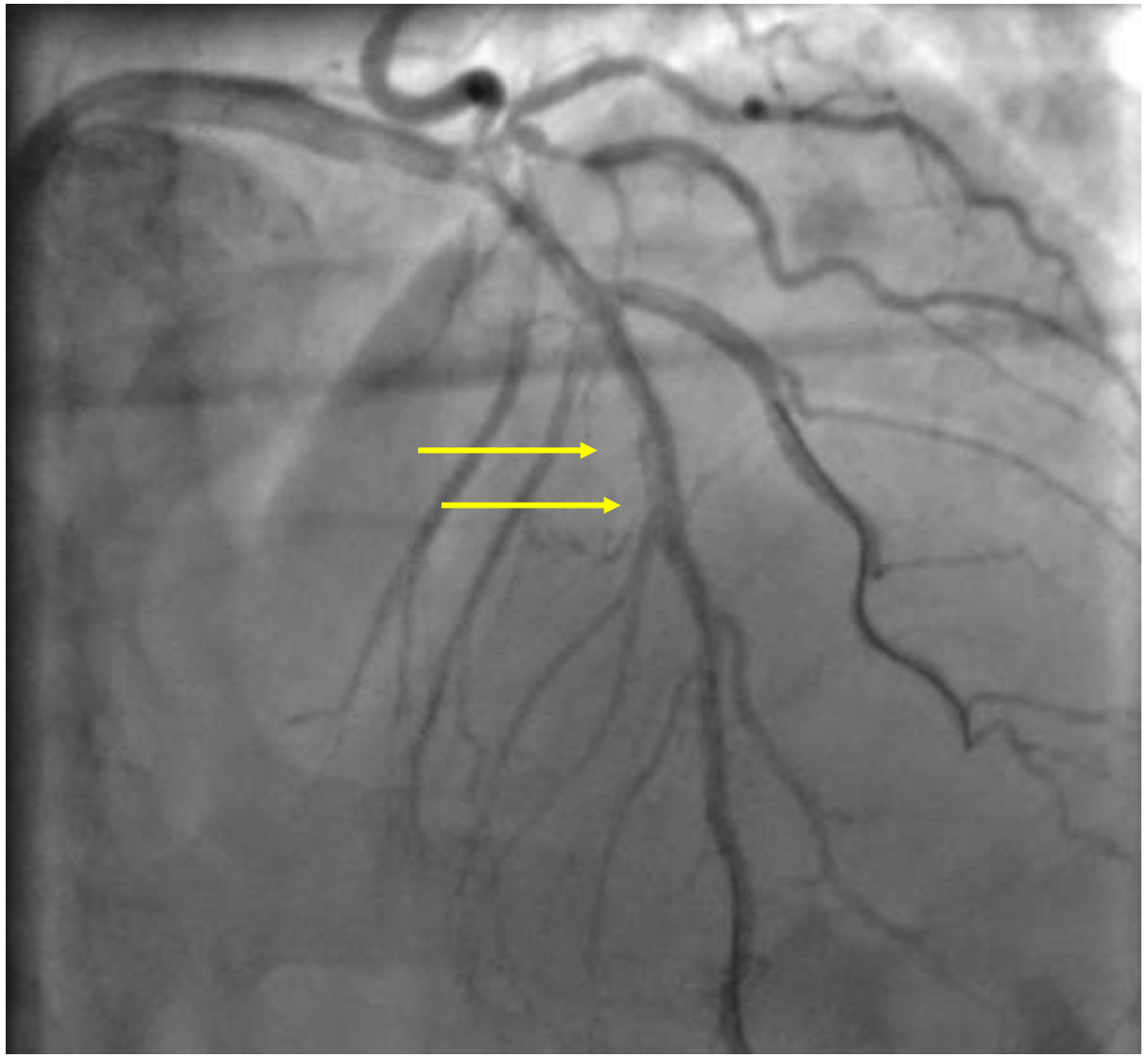




Lesion Preparation and Control

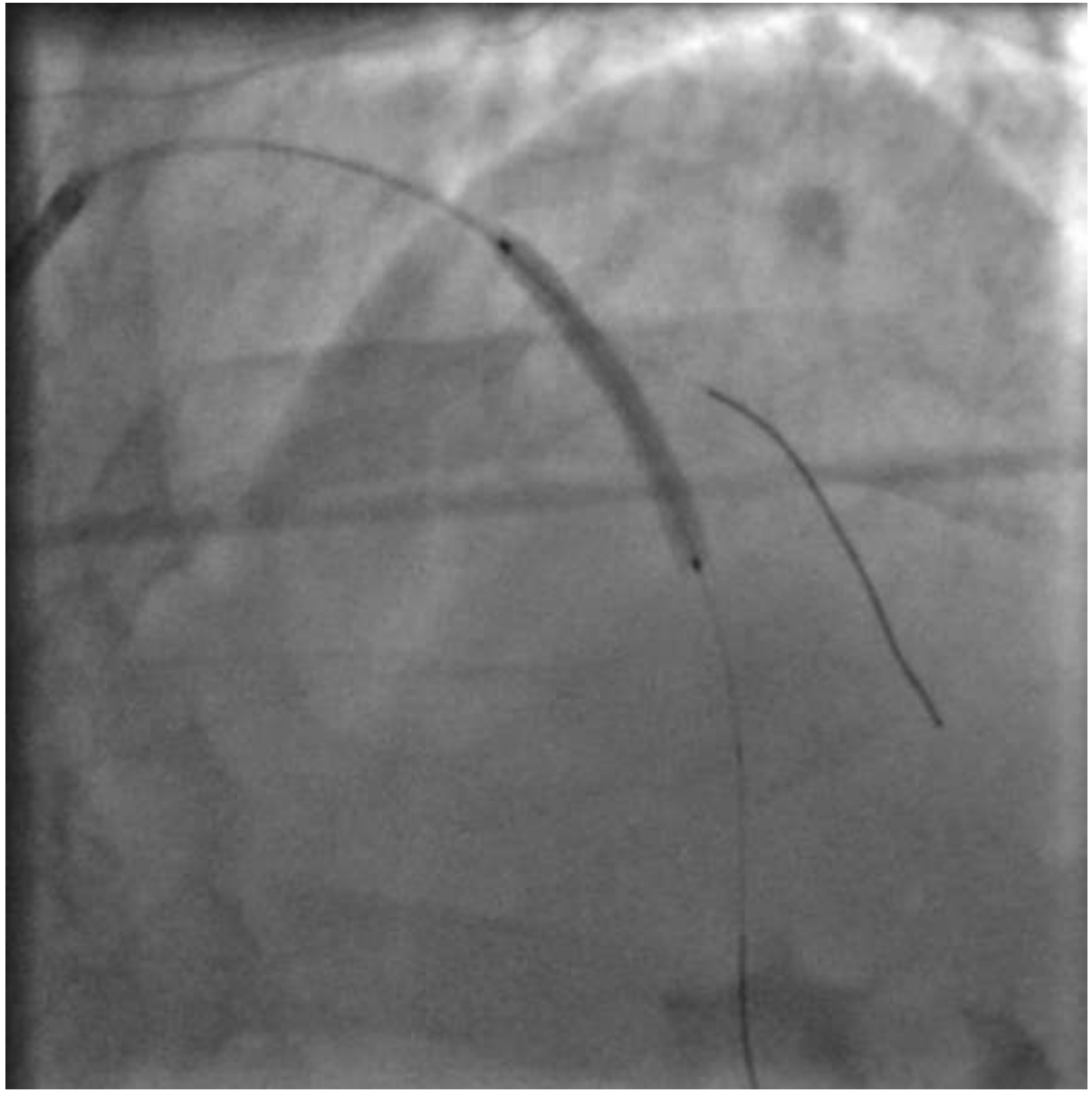


Balloon predilation SC 2.5 x 30 mm

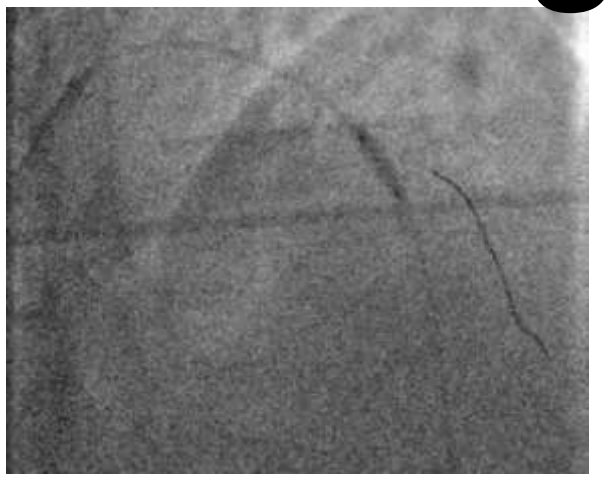


Control – Type C dissection

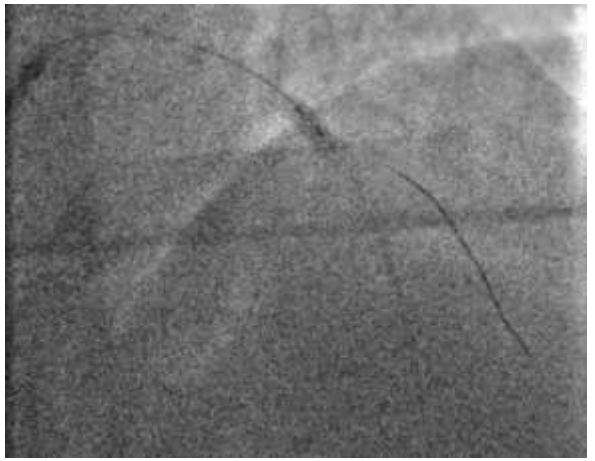
Bailout Stenting



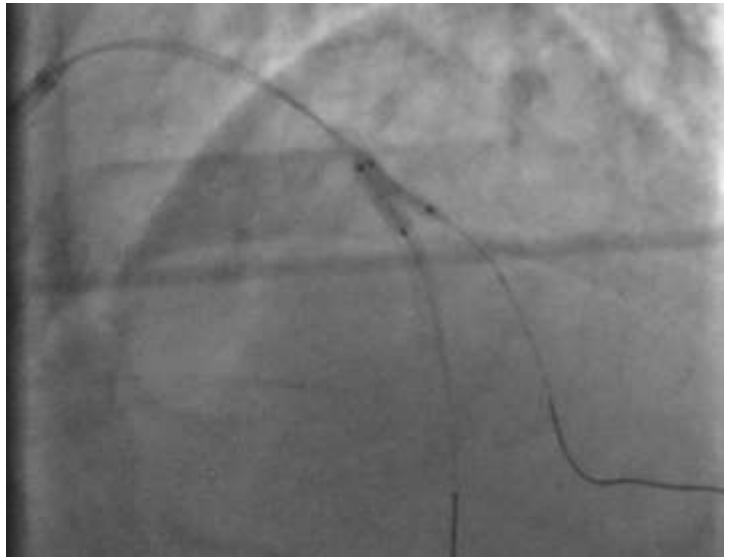
DES 2.75 x 30 mm



Postdilation



POT



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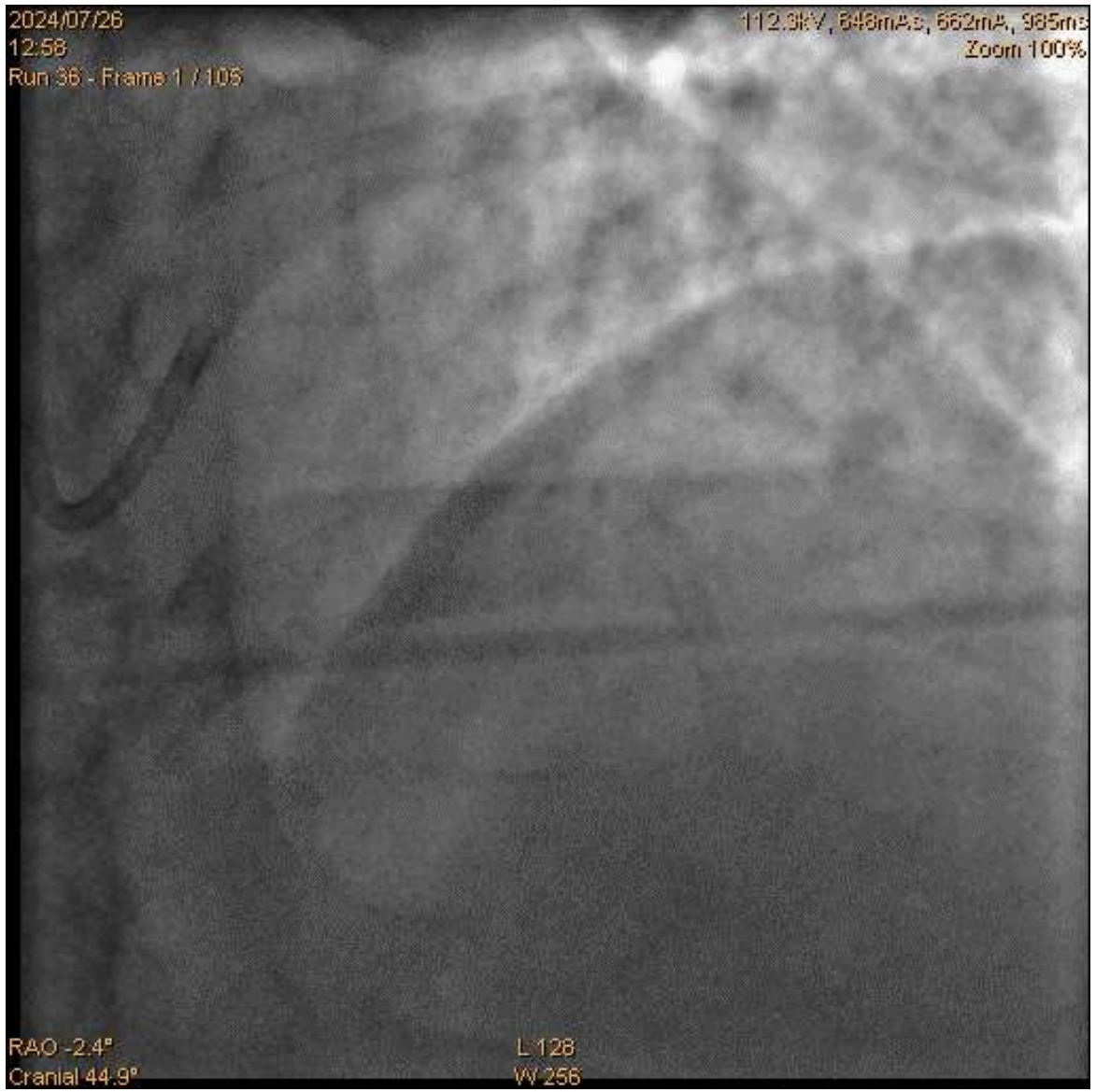

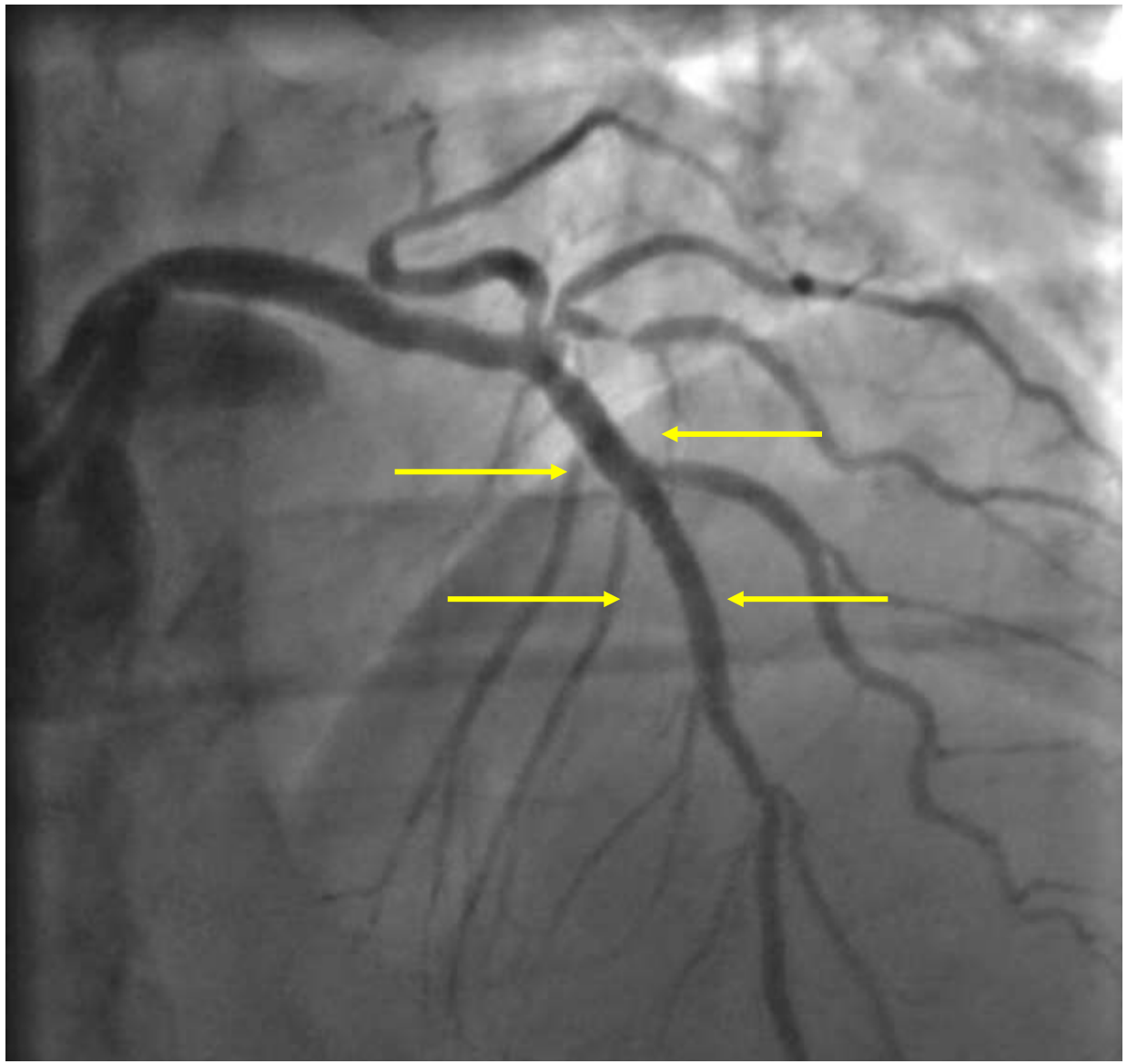

Resultado final

DCB in *De Novo* Lesions

- Concepts
- Techniques
- **Technologies**

DCB Systems Specifics

Device	Company	Drug	Dose (µg/mm^2)	Additive
SeQuent Please Neo	B.Braun	Paclitaxel	3.0	Iopromide
Agent	Boston Scientific	Paclitaxel	2.0	Acetyl tributyl citrate
Prevail	Medtronic	Paclitaxel	3.5	Urea
Pantera Lux	Biotronick	Paclitaxel	3.0	n.Butyryl citrate
Restore	Cardionovum	Paclitaxel	3.0	Shellac
Elutax SV	Aachen Resonance	Paclitaxel	2.2	None
Magic Touch	Concept Medical	Sirolimus	1.3	Phospholipid
Selution	**Med Alliance (Cordis)**	**Sirolimus**	**1.0**	**Micro-reservoirs**
Virtue	Caliber Therapeutics	Sirolimus	NA	Nanoparticles
SeQuen SCB	B.Braun	Sirolimus	4.0	Crystalline

SELUTION First-in-Man Trial

Contents lists available at ScienceDirect

Cardiovascular Revascularization Medicine

Sirolimus-coated balloon with a microsphere-based technology for the treatment of de novo or restenotic coronary lesions

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ABSTRACT

Background: Non stent-based local drug delivery with drug-coated balloon (DCB) is an alternative to drug-eluting stent with favorable clinical applicability in the treatment of selected coronary lesions. Our purpose was to report the initial performance, safety and efficacy evaluations of a novel sirolimus-coated balloon in the treatment of coronary lesions.

Methods: This was a phase I (first-in-man), prospective, multicenter, single-arm trial evaluating the novel SELUTION SLR™ DCB (M.A. Med Alliance SA, Nyon, Switzerland), which incorporates a polymeric microsphere-based technology for controlled and continuous release of sirolimus, in the treatment of de novo or restenotic lesions.

Patient Population

Table 2
Preprocedure lesion morphology.

Variable	N = 56
Eccentric	21.4 (12/56)
Calcium (moderate/severe)	14.3 (8/56)
Tortuosity	1.8 (1/56)
Thrombus	1.8 (1/56)
Bifurcation	30.4 (17/56)
SB stenosis < 50 %	58.8 (10/17)
SB stenosis ≥ 50 %	41.2 (7/17)
ISR	21.4 (12/56)
ISR type[a]	
IA	0.0 (0/12)
IB	0.0 (0/12)
IC	41.7 (5/12)
ID	0.0 (0/12)
II	50.0 (6/12)
III	0.0 (0/12)
IV	8.3 (1/12)
Lesion type (ACC/AHA)	
A	21.4 (12/56)
B1	37.5 (21/56)
B2	37.5 (21/56)
C	3.6 (2/56)
TIMI flow	
Grade 0	1.8 (1/56)
Grade 1	1.8 (1/56)
Grade 2	8.9 (5/56)
Grade 3	87.5 (49/56)

- Non-randomized, single arm study
- 06 clinical sites in Asia
- Single lesion per patient (56/56)
- Diabetes in 46.6%
- ***De novo* lesions in 78.6%**
- Type B2/C in 41.1%
- Angiographic follow-up at 6 months
- Independent core lab analysis
- Clinical follow-up up at 1 and 2 years

Costa RA, et al. Cardiovasc Revasc Med. 2022;45:18-25

Results in the *De Novo* Subset

Preprocedure QCA

Variable (n = 44)	Mean ± SD
Lesion length, mm	9.86 ± 4.69
Reference Diameter, mm	2.03 ± 0.29
MLD, mm	0.67 ± 0.28
% DS	67.25 ± 12.8

Costa RA, et al. Oral presentation at CRT 2022. Washington, DC, USA.

Postprocedure QCA

Variable (n = 43)	Mean ± SD
Reference Diameter, mm	**2.13 ± 0.3**
MLD, mm	1.63 ± 0.32
% DS	**23.61 ± 10.08**
Acute gain, mm	**0.96 ± 0.34**

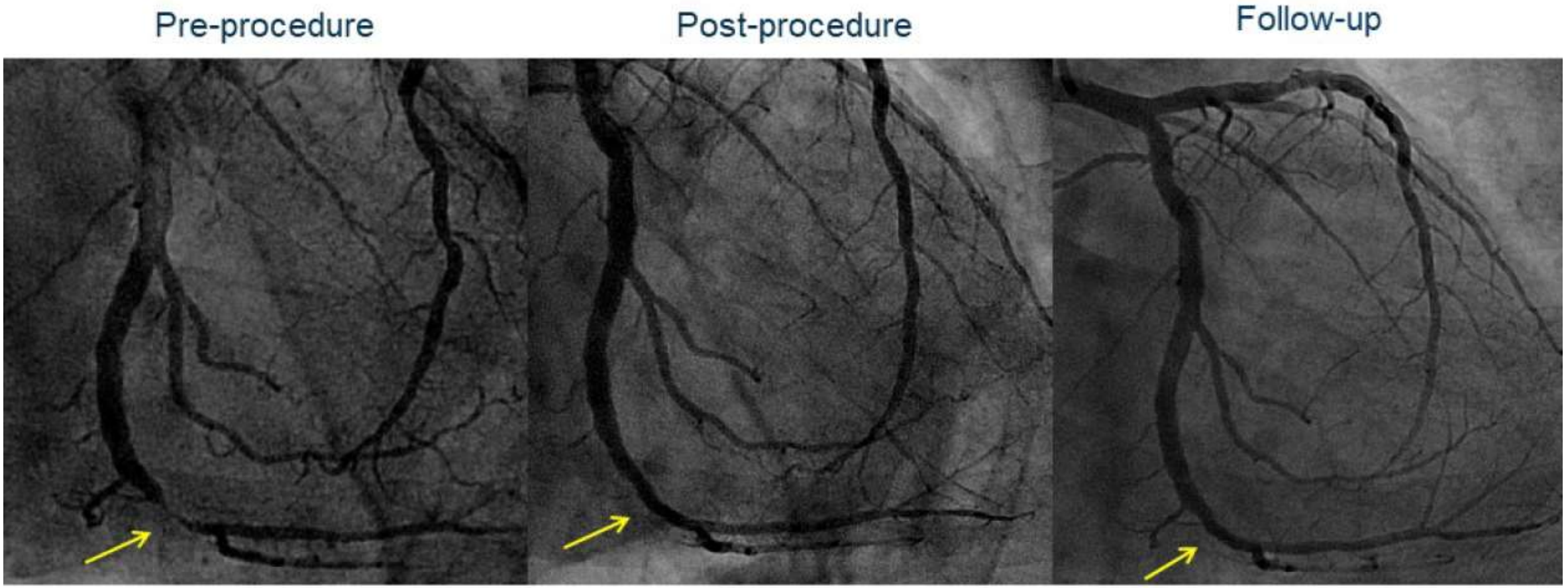
Costa RA, et al. Oral presentation at CRT 2022. Washington, DC, USA.

6-Month Follow-up QCA

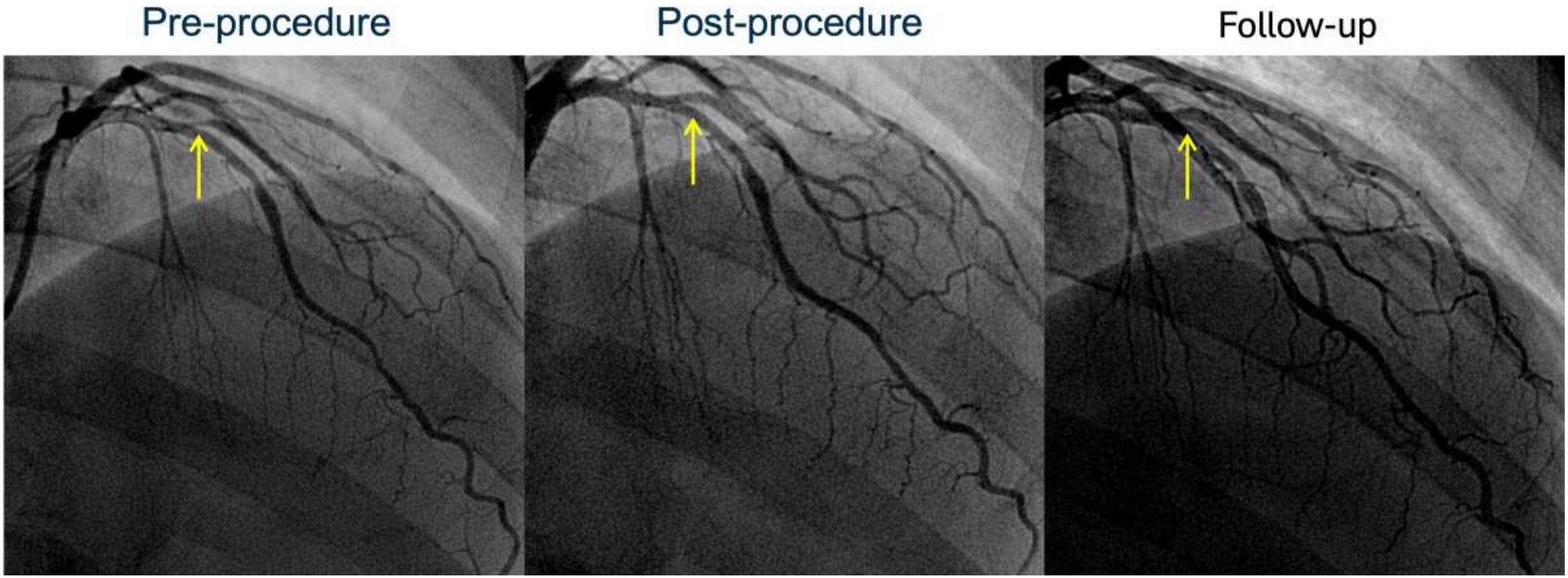
Variable (n = 34)	Mean ± SD
Reference diameter, mm	2.06 ± 0.33
MLD, mm	1.48 ± 0.37
% DS	**28.32 ± 12.67**
Late lumen loss, mm	**0.16 ± 0.19**

Costa RA, et al. Oral presentation at CRT 2022. Washington, DC, USA.

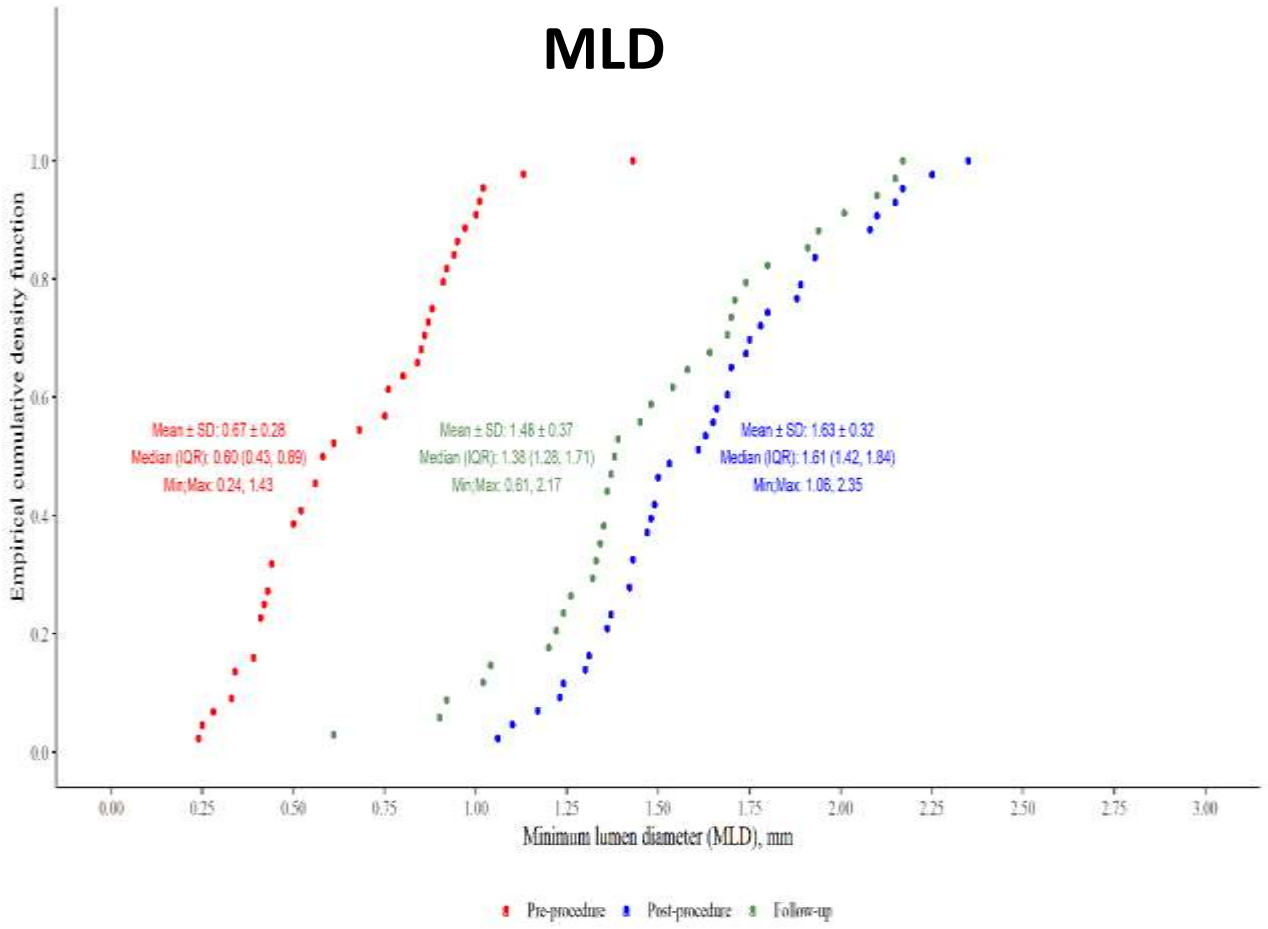
De Novo Severe Stenosis in LCx

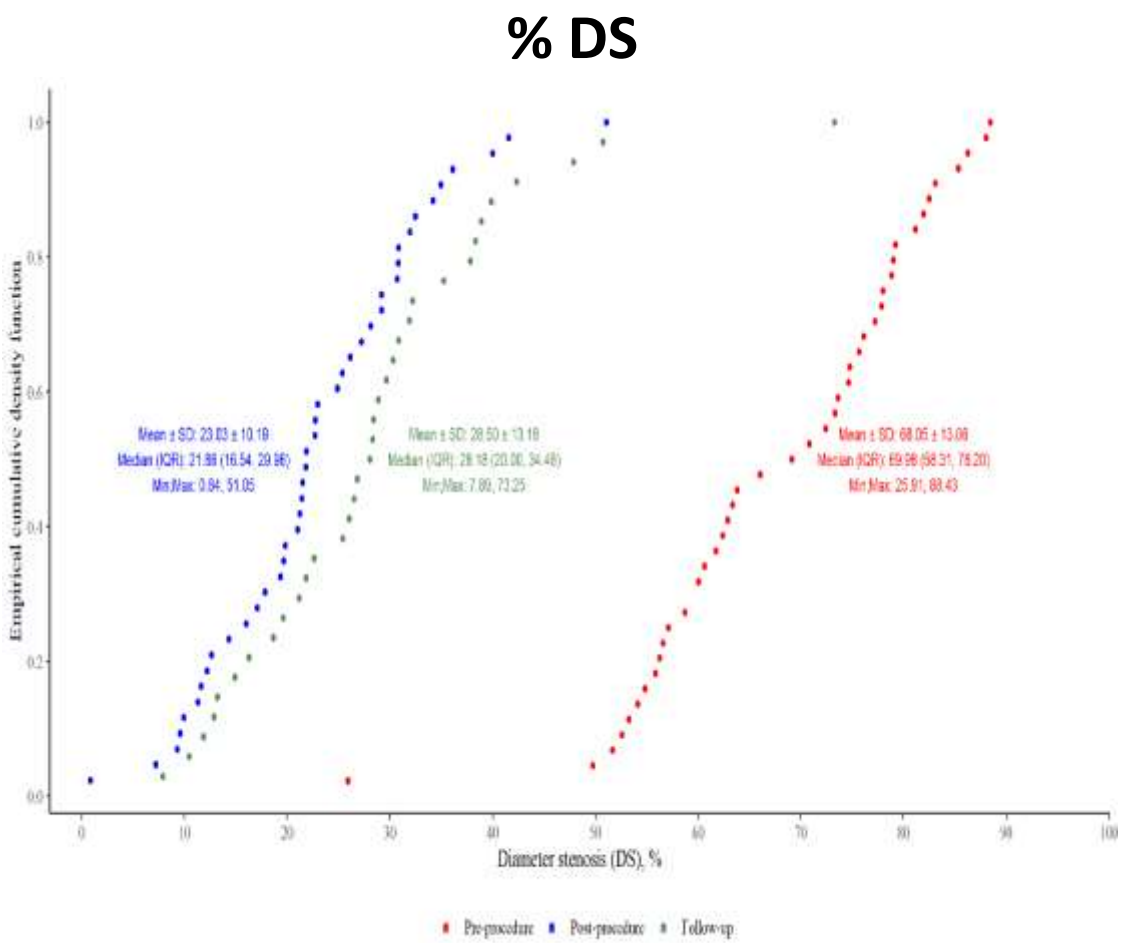


Side Branch of Bifurcation Lesion



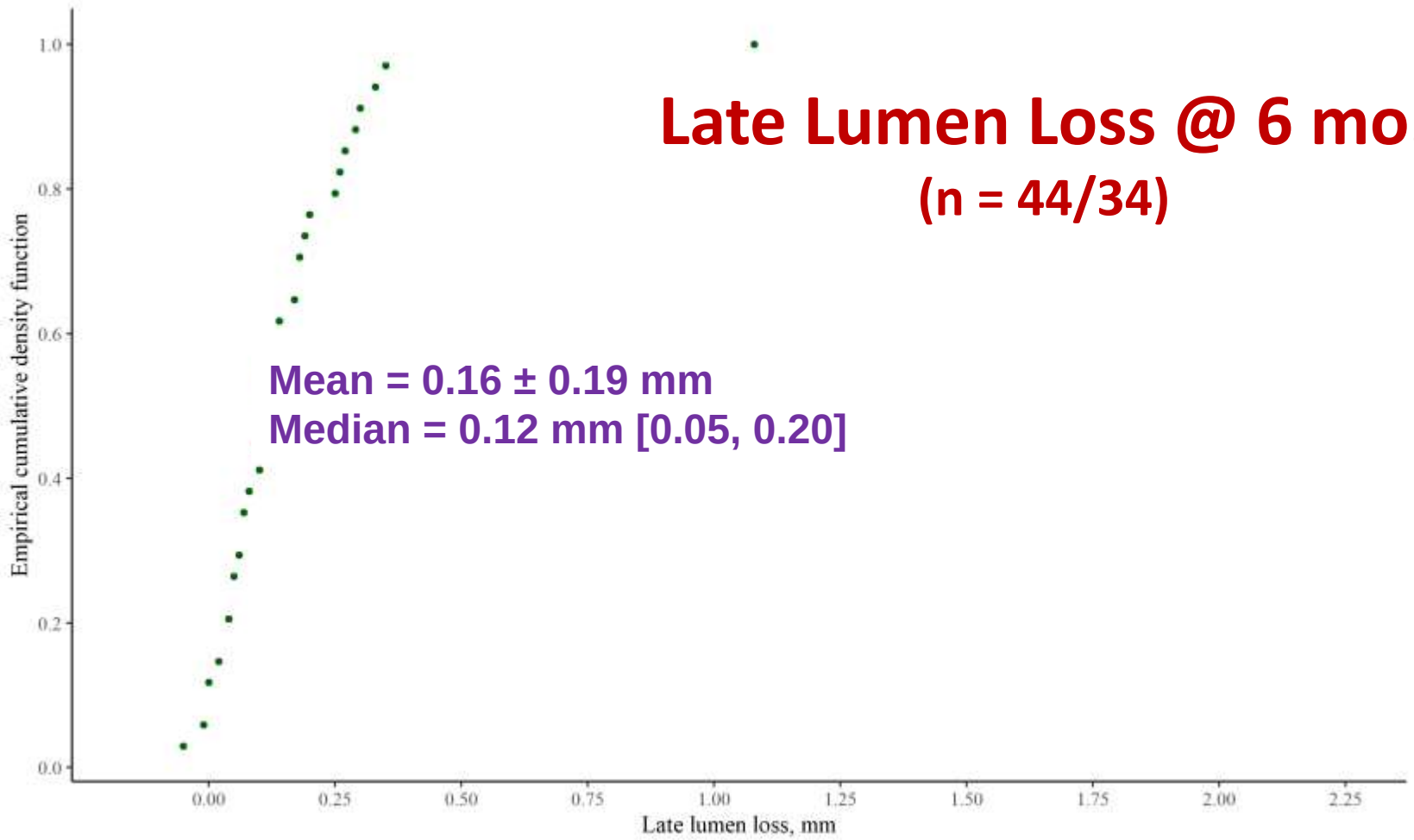
CFD Curves for MLD and %DS





Costa RA, et al. Oral presentation at CRT 2022. Washington, DC, USA.

LLL at 6 Months in *De Novo* Subset



Costa RA, et al. Oral presentation at CRT 2022. Washington, DC, USA.

PCB versus SCB

Systematic Review & Metanalysis

- 1861 patients (889 in PCB and 972 in SCB groups)
- Clinical follow-up at 9-12 months
- No significant differences in study outcome of TLF (CD, TV-MI or TLR) – OR 1.01 (95% CI: 0.75-1.35)
- Angiographic follow-up at 6-9 months:
- Larger MLD with PCB (WMD 0.10, 95% CI 0.02-0.17)
- Similar LLL and % diameter stenosis

Shin D, et al. Catheter Cardiovasc Interv. 2024. Online ahead of print.

SELUTION SLR™ LATAM countries approved

Country
Argentina
Chile
Uruguay
México
Colombia
Perú
Ecuador
Panamá
República Dom

DCB in *De Novo* Lesions

- Concepts
- Techniques
- Technologies
- **Lesion selection**

DCB in Daily Practice

- **ISR ~ 80%**
- Small vessels
- Diffuse atherosclerosis
- SB ostium of bifurcation lesion
- CTO
- Limited DAPT duration
- Impossibility to advance metallic scaffold
- Hypersensibility to a DES and its components

DCB in *De Novo* Lesions

- Concepts
- Techniques
- Technologies
- Lesion selection
- **Optimal vessel preparation**

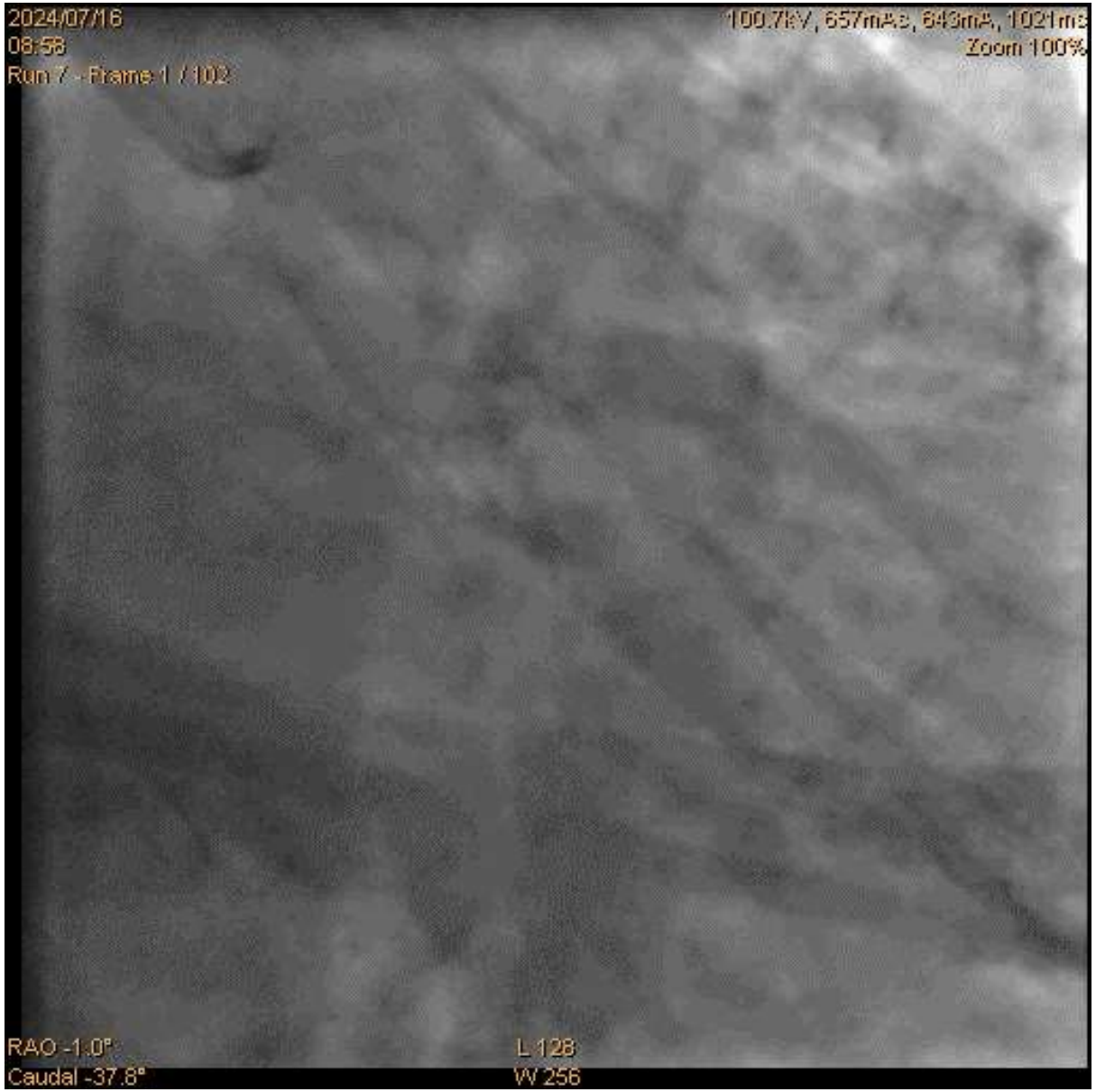
Technical Refinements

- **Take the time for proper lesion preparation!**
- SC balloons may cause less dissection, but maybe less effective for acute luminal gain
- NC balloons are more effective for luminal gain
- Gentle and progressive balloon inflation and deflation
- High pressure inflation as required for optimal angiographic result, respecting the proposed ratio (1:1 or up to 1:1.1)
- Careful observation and control of how dissections evolve. acutely
- Prolonged balloon inflation prior to DCB, if tolerated
- Apply multiples predilatations if needed
- ↑ balloon diameters and be prepared to use adjunctive tools as required
- Shorter balloons for lesion preparation and longer DCB for drug delivery

Provisional DES if Required!

Source: https://panthernow.com/2015/07/03/the-obvious-answer/

Case Example


2024/07/16
08:58
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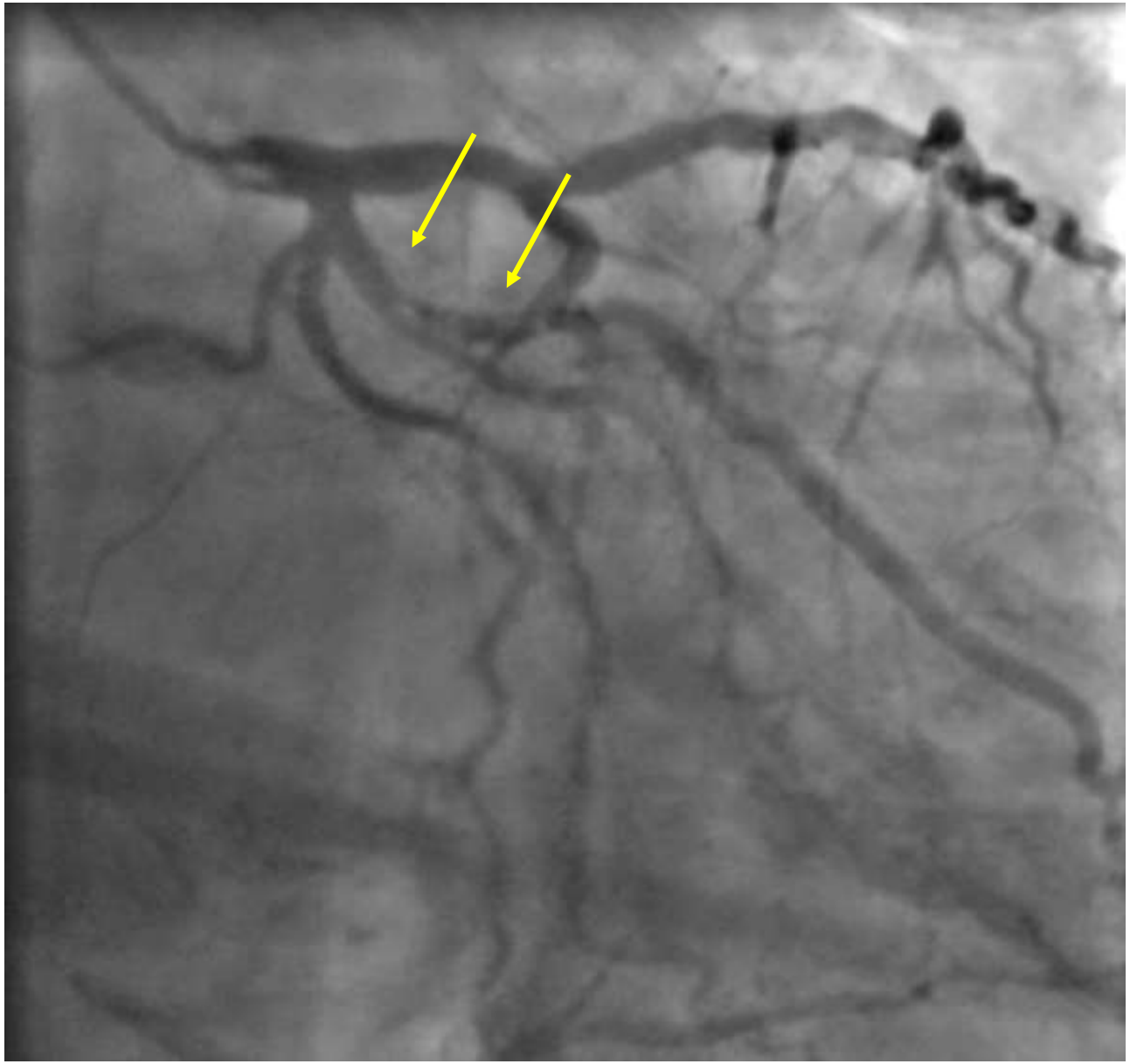
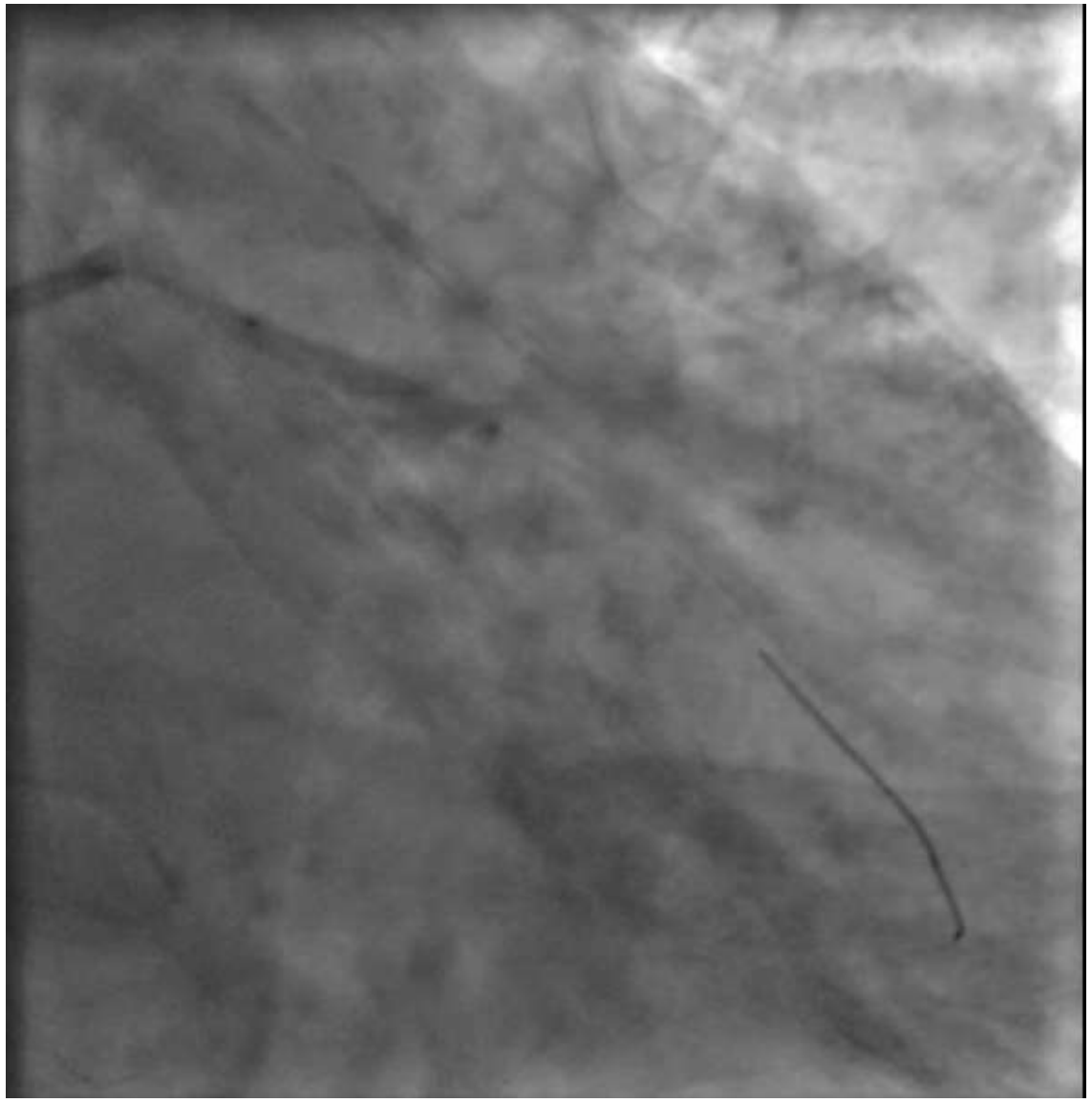
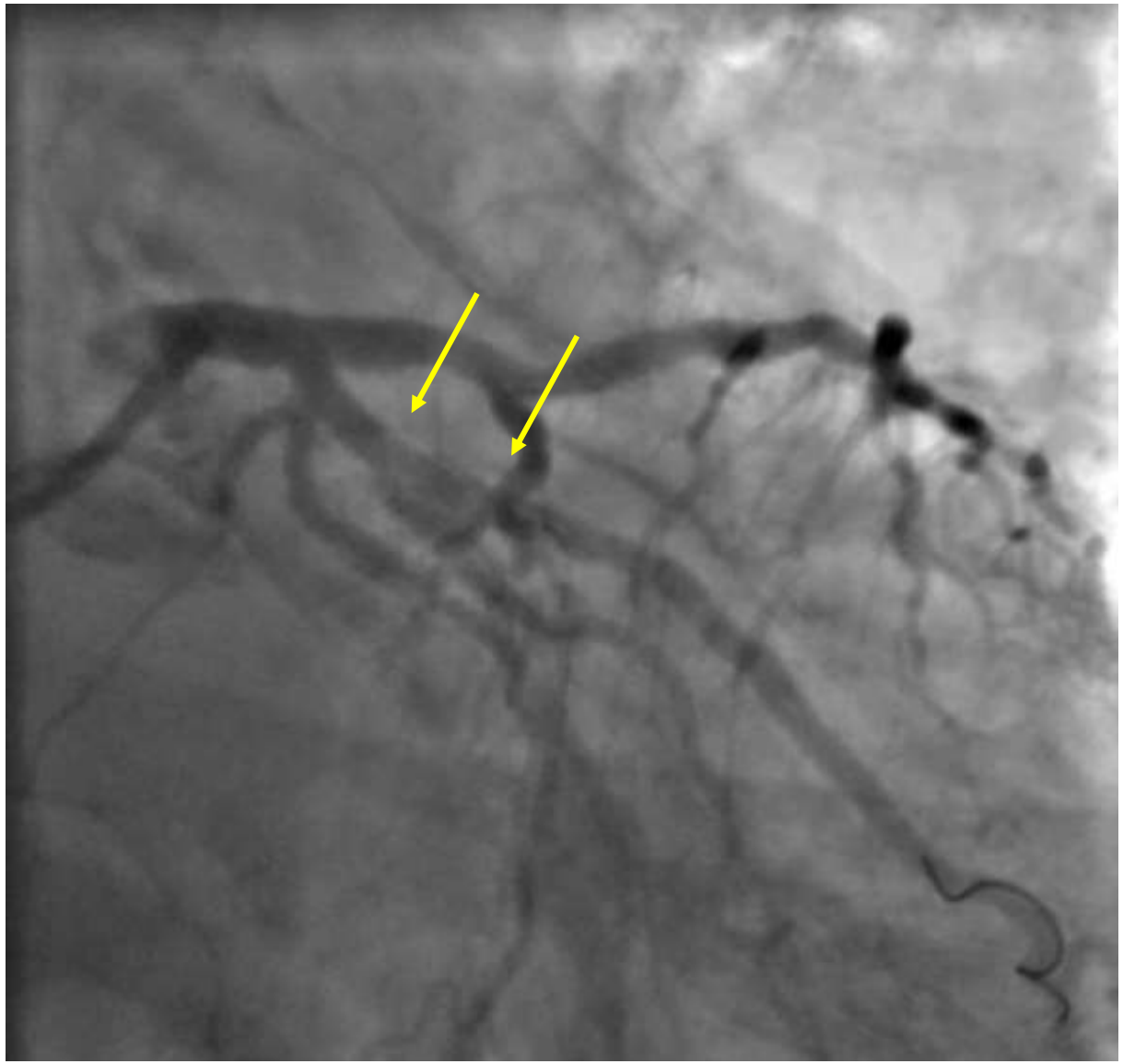
Zoom 100%
RAO -1.0°
Caudal -37.8°
L 128
W 256

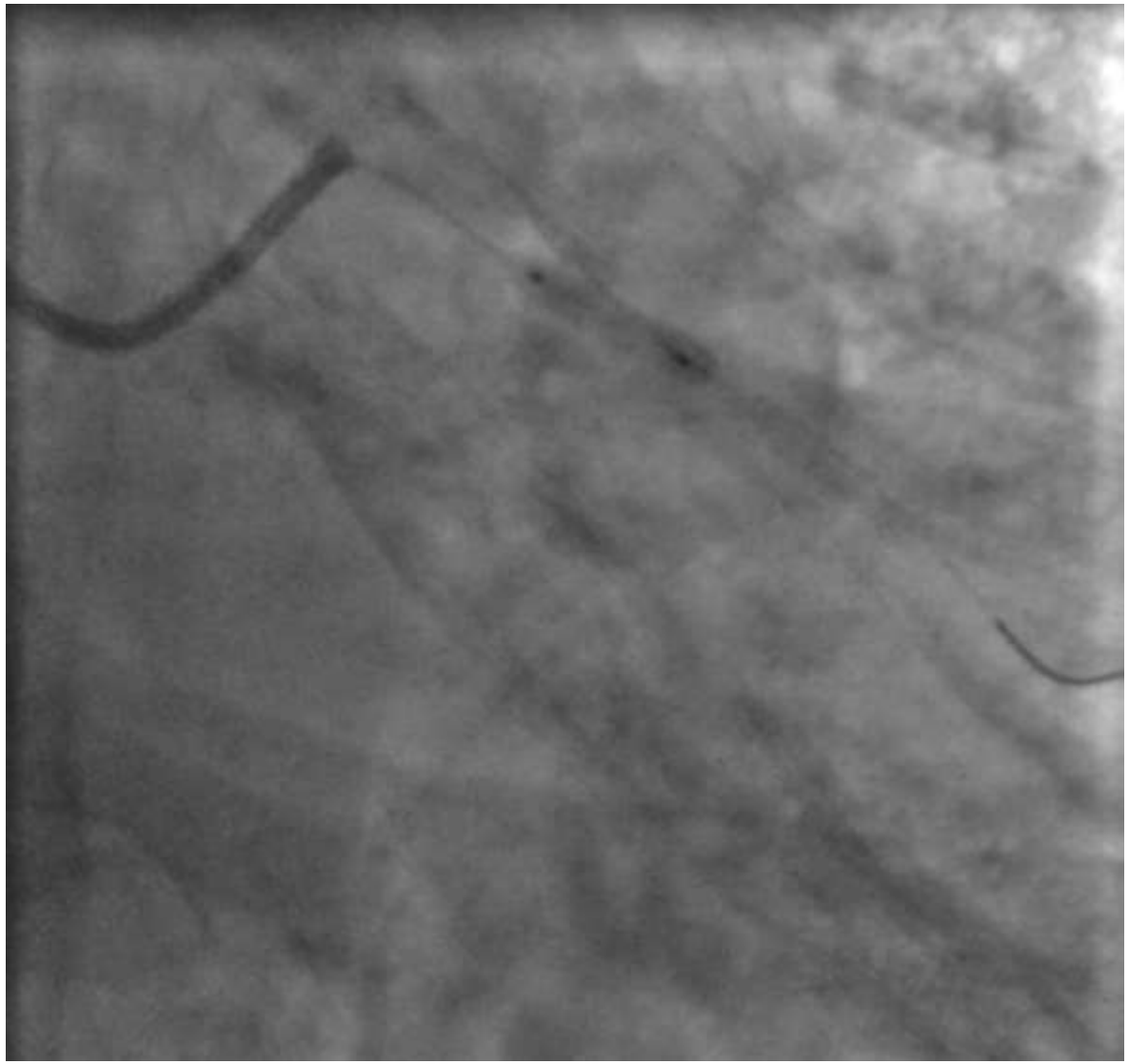




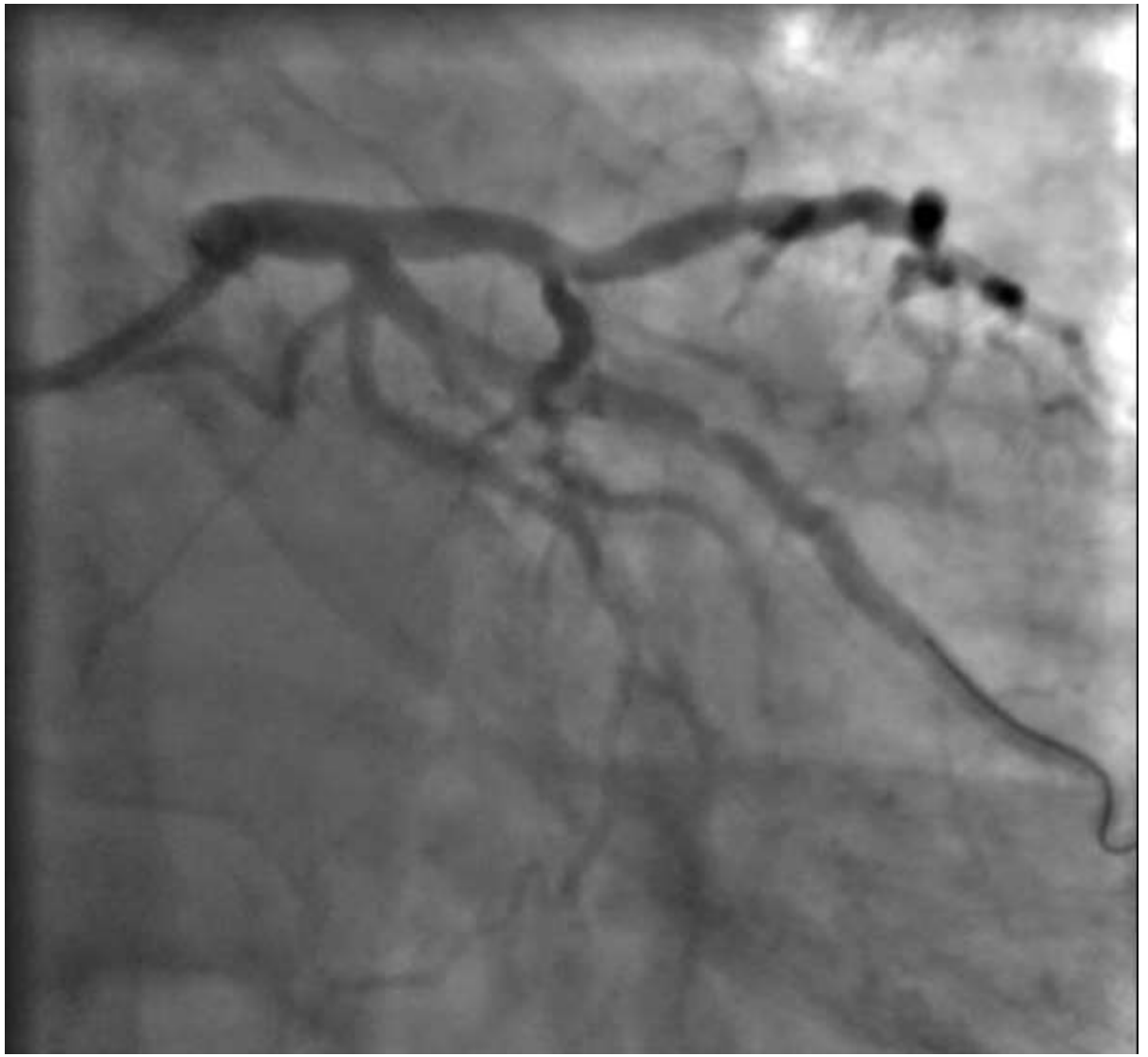
Pré-dilatação balão SC 2.5 x 20 mm



Controle



Pré-dilatação balão NC 3.0 x 12 mm



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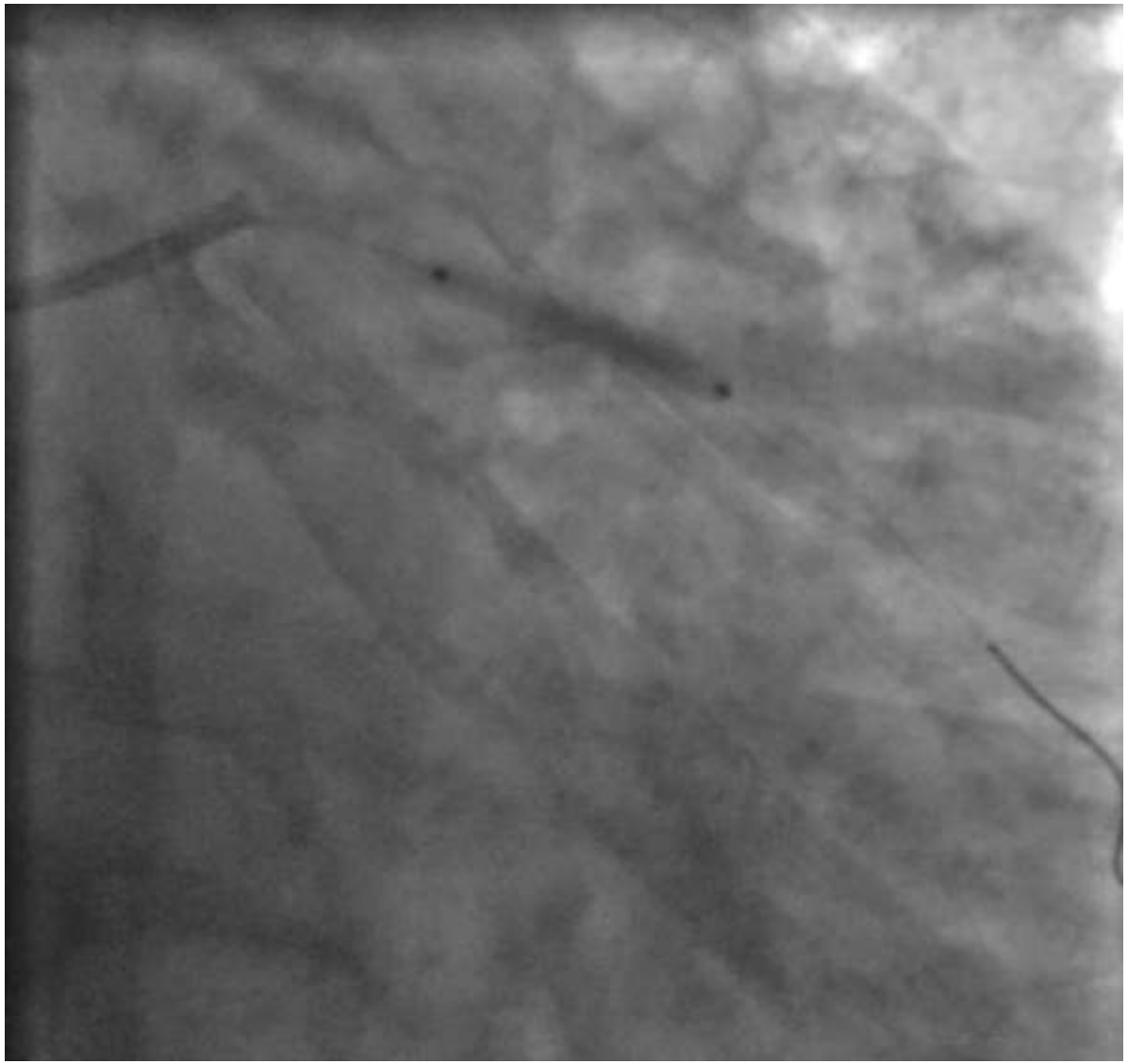
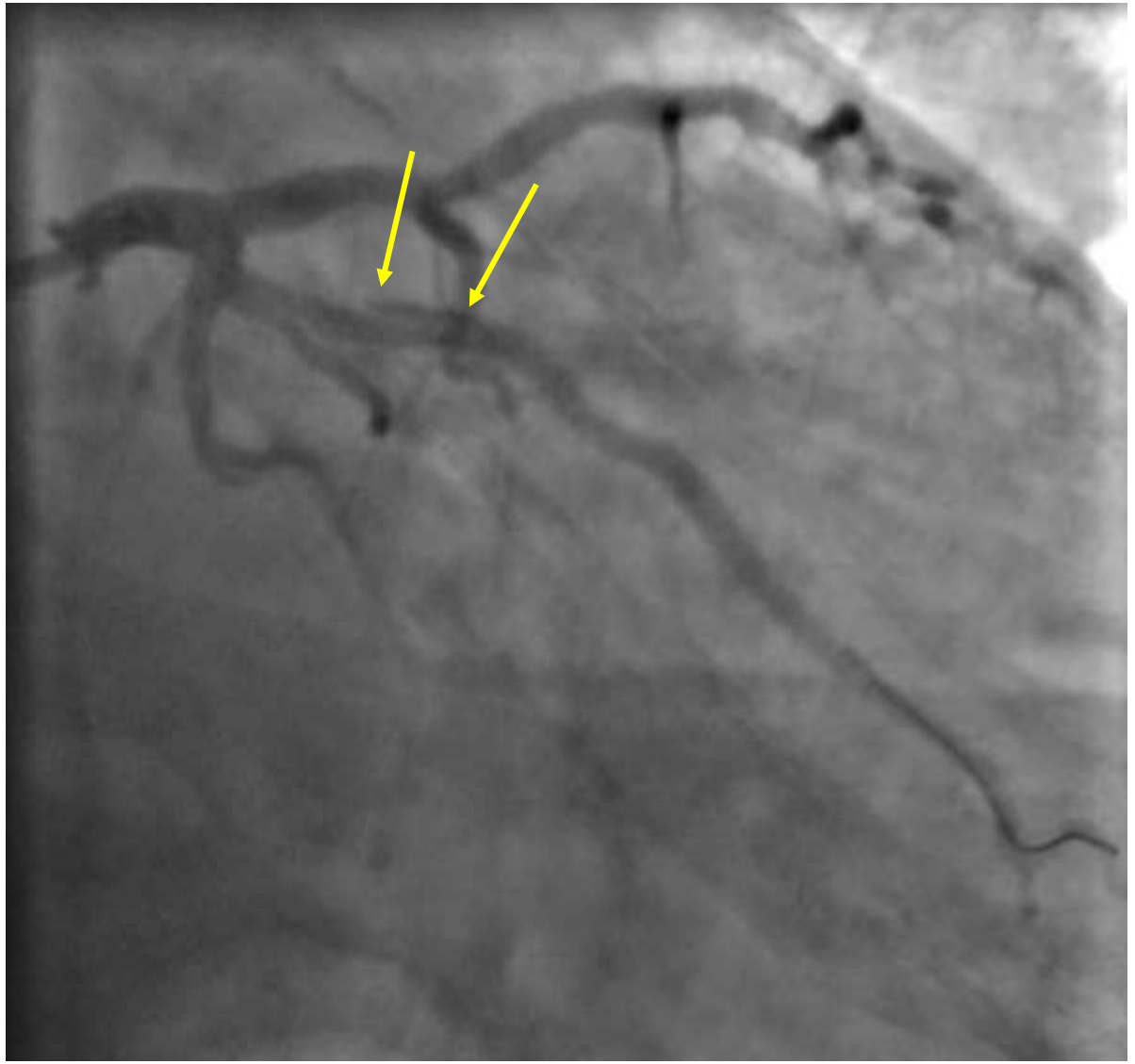
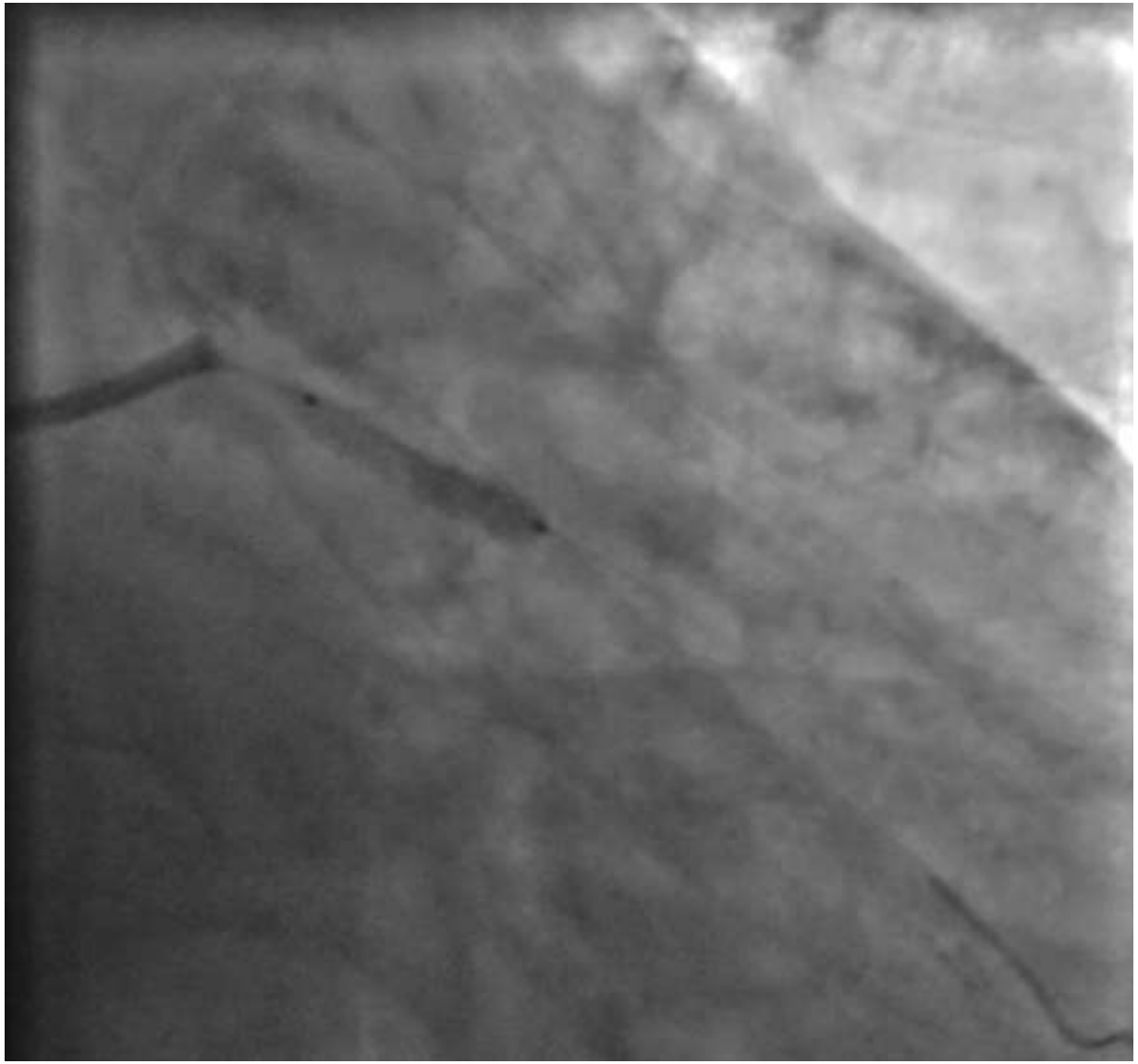


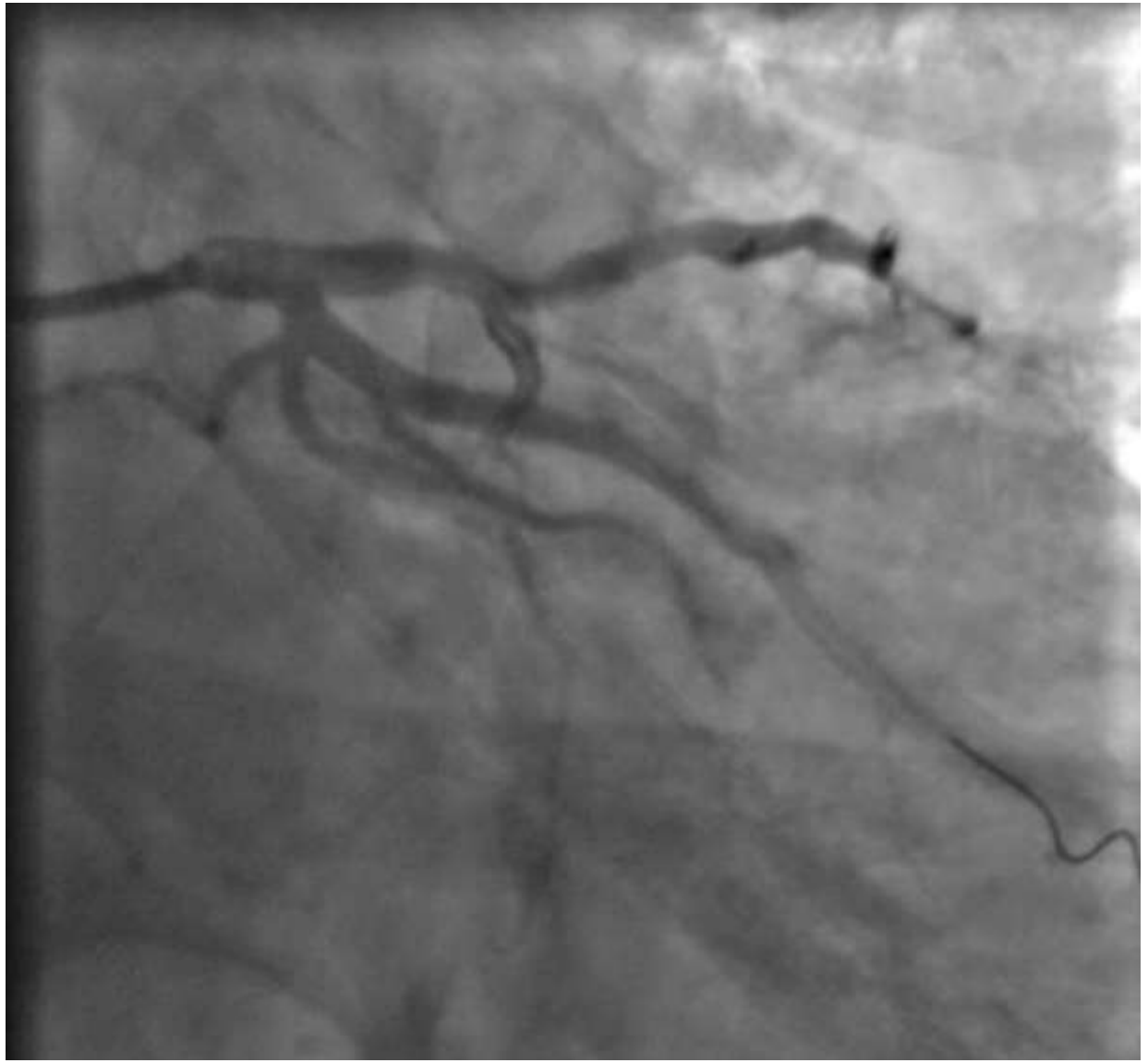
DCB 3.0 x 20 mm



Controle após DCB



Implante de Stent Farmacológico 3.0 x 16 mm



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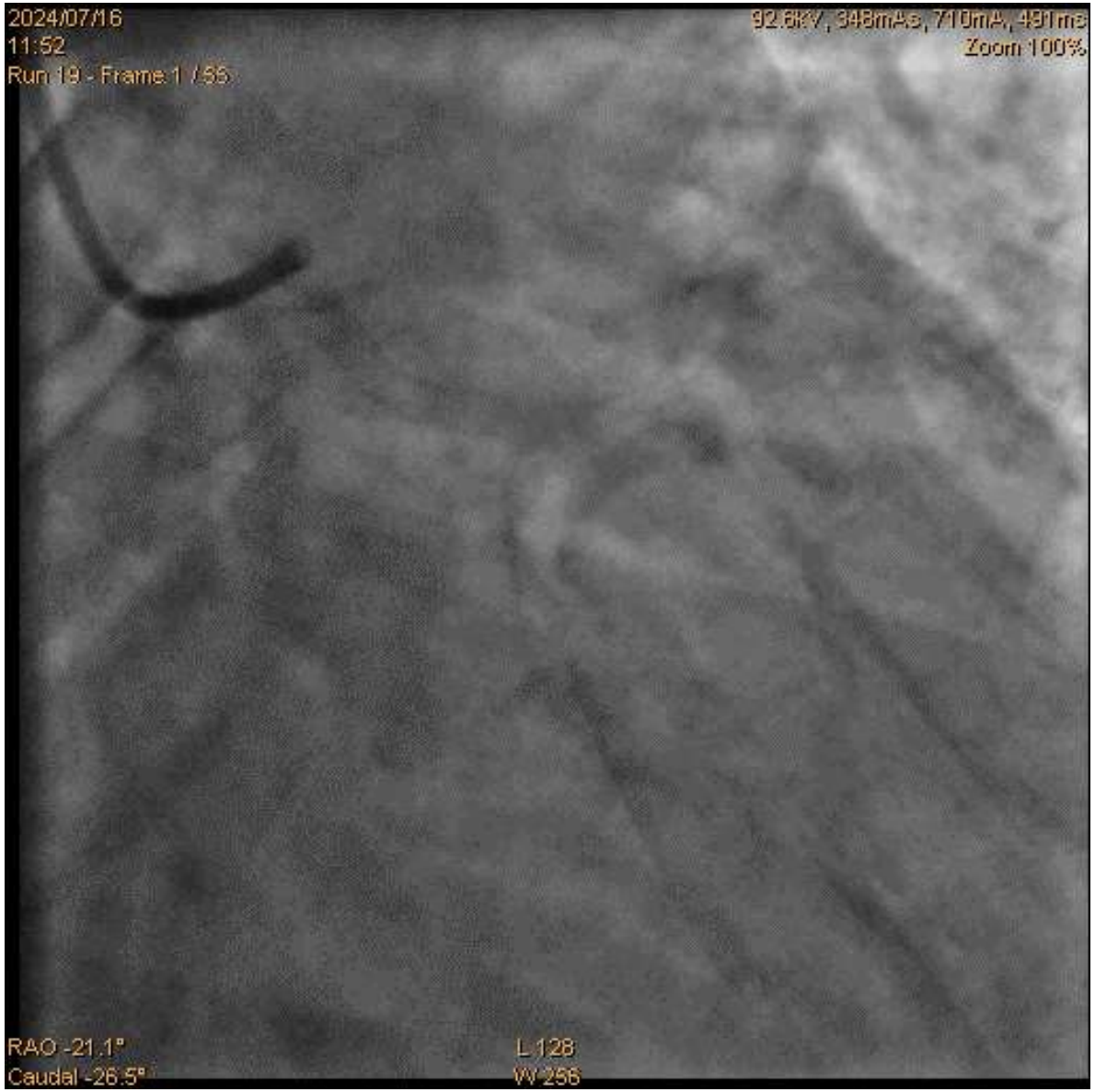
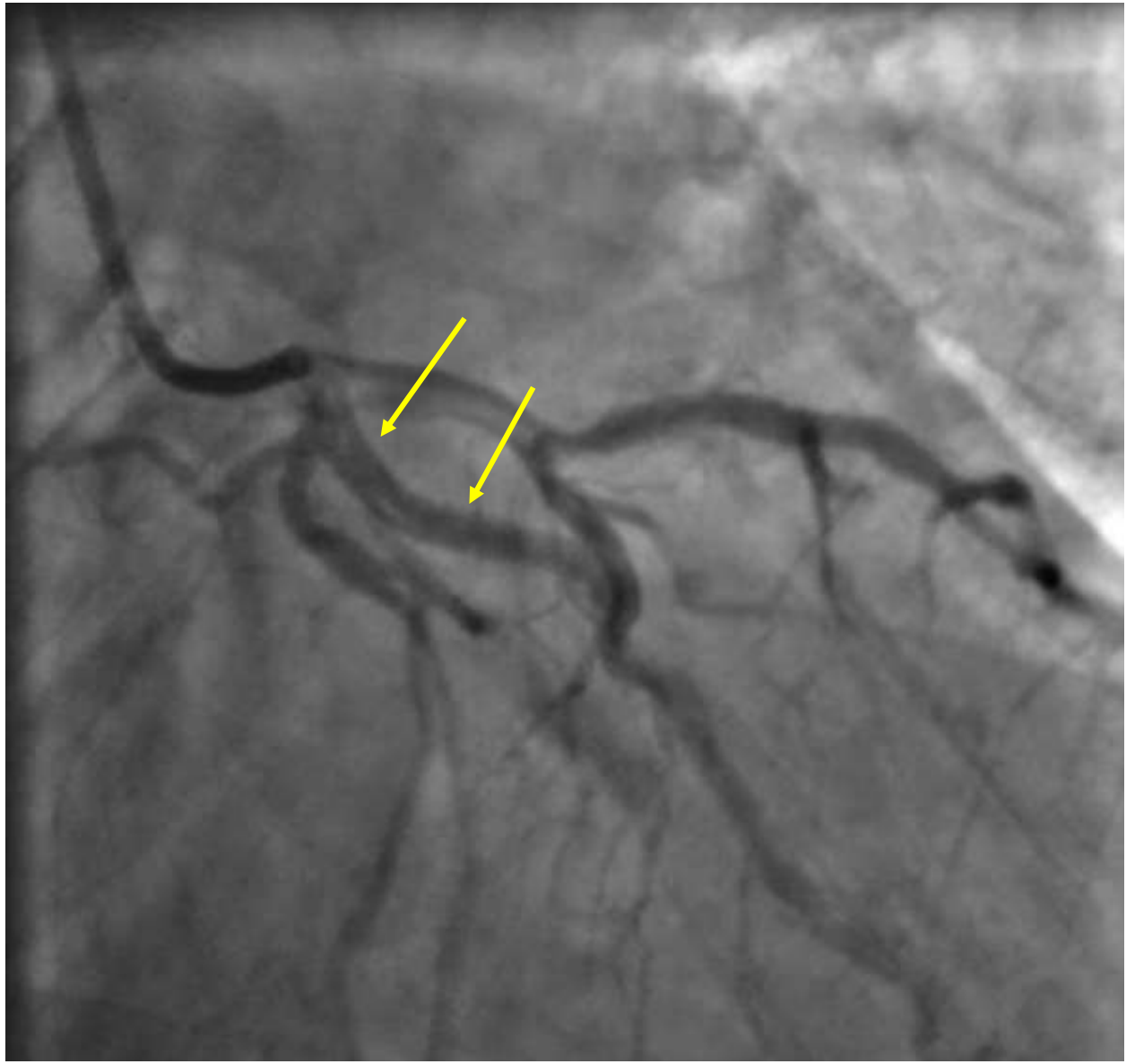




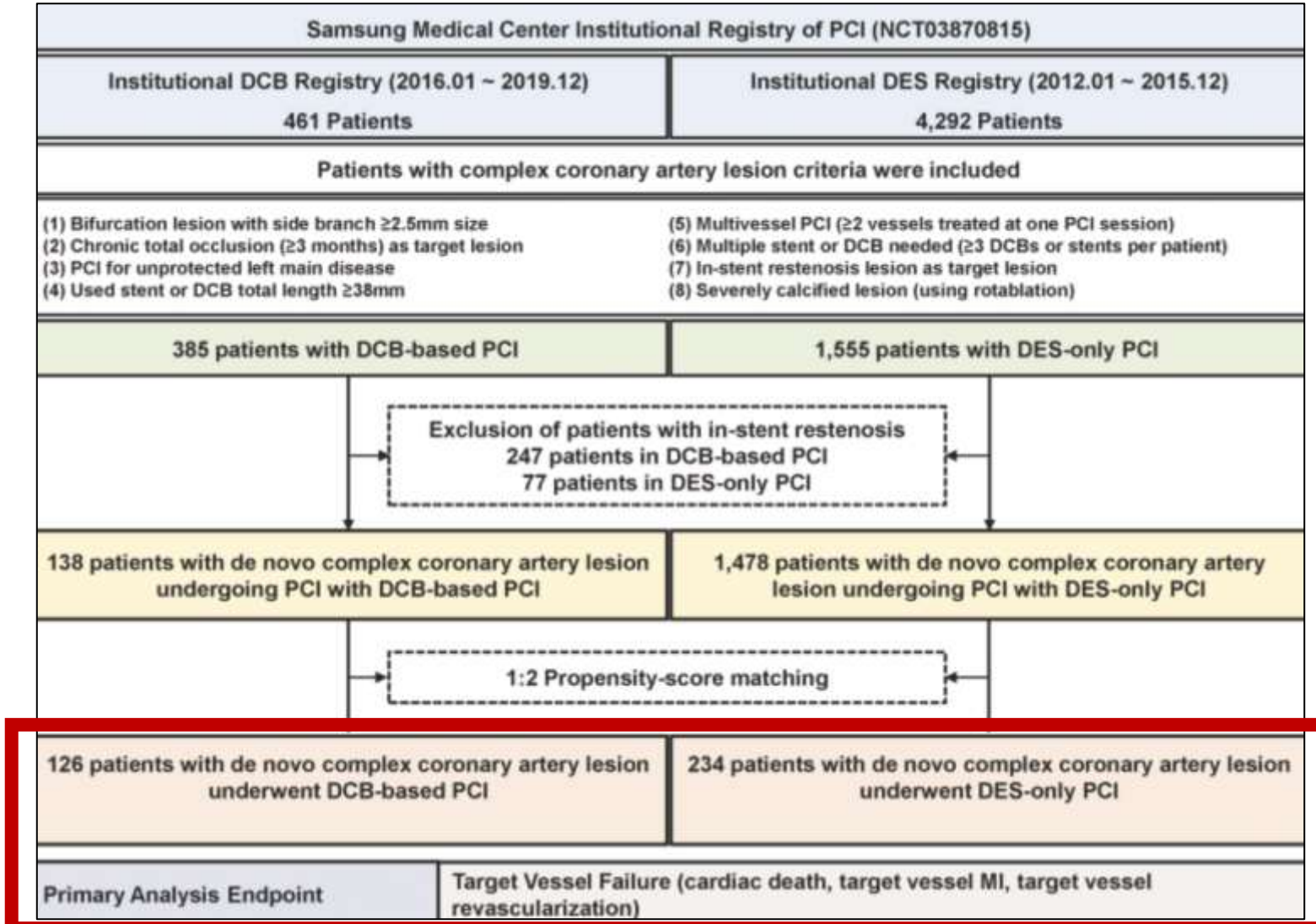
Resultado final

DCB in *De Novo* Lesions

- Concepts
- Techniques
- Technologies
- Lesion selection
- Optimal vessel preparation
- **Recent clinical evidence**

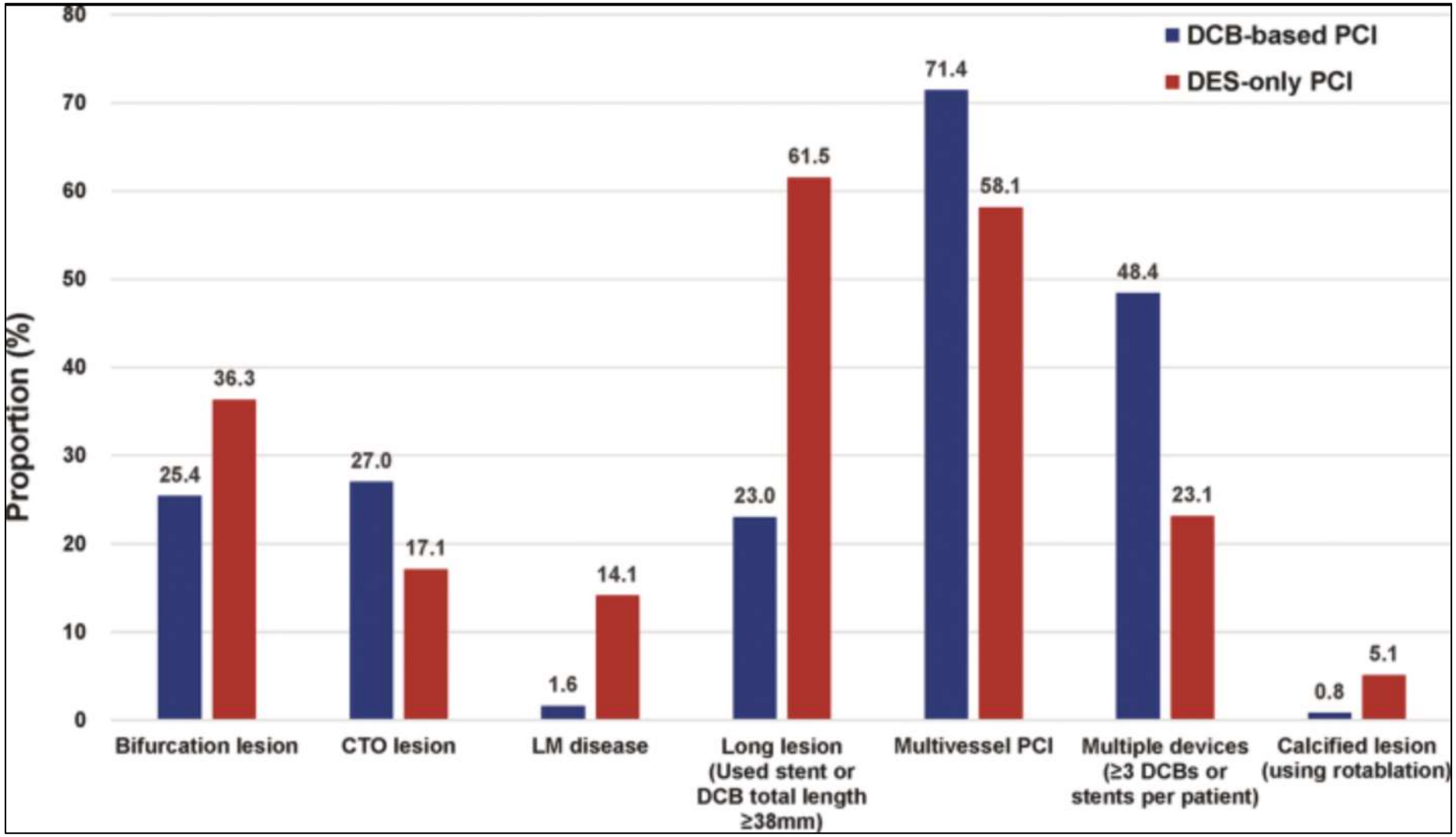
DCB versus DES

Propensity-Matched Analysis



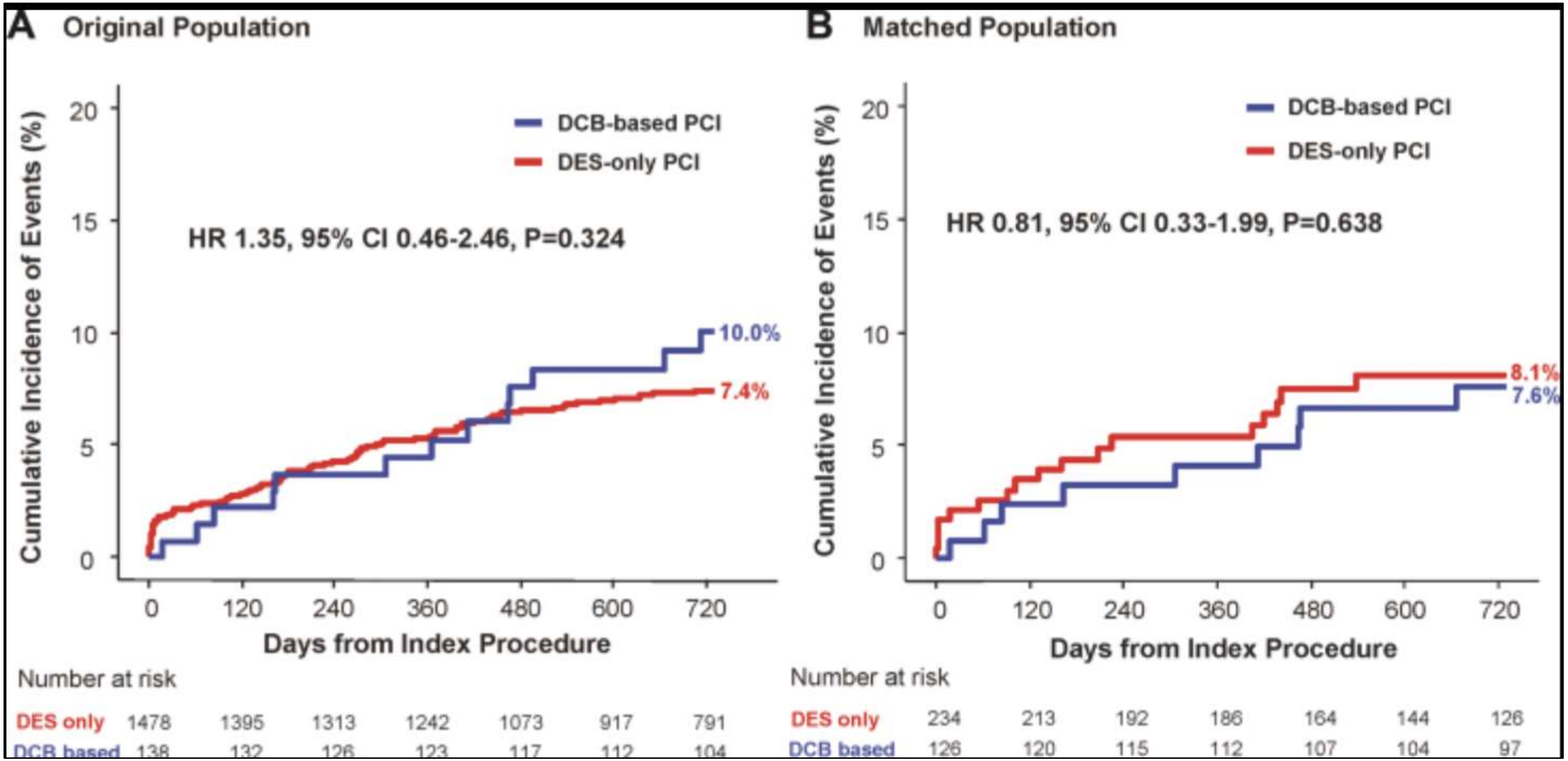
Joh HS, et al. JACC Asia. 2024;4:519-31

Complex Lesion Profile



Joh HS, et al. JACC Asia. 2024;4:519-31

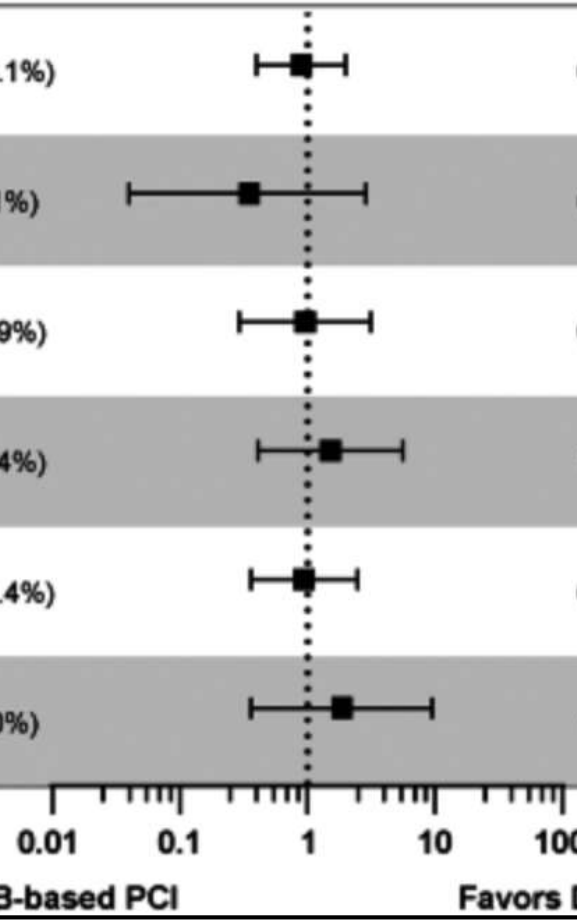
Long-Term Outcomes



Joh HS, et al. JACC Asia. 2024;4:519-31

Results by Lesion Type

	Total population	DCB-based PCI	DES-only PCI	HR (95% CI)	P value
All lesions	26/360 (8.0%)	9/126 (7.6%)	17/234 (8.1%)	0.90 (0.40-2.01)	0.791
Bifurcation lesion	7/121 (6.7%)	1/35 (3.3%)	6/86 (8.1%)	0.35 (0.04-2.88)	0.326
CTO lesion	11/74 (16.9%)	5/34 (16.5%)	6/40 (16.9%)	0.96 (0.29-3.15)	0.946
Long lesion	12/173 (8.3%)	3/29 (11.4%)	9/144 (7.4%)	1.51 (0.41-5.59)	0.535
Multivessel PCI	17/226 (8.4%)	7/90 (8.2%)	10/136 (8.4%)	0.94 (0.36-2.46)	0.894
Use of multiple devices	7/115 (7.1%)	5/61 (8.7%)	2/54 (5.0%)	1.86 (0.36-9.60)	0.460



Joh HS, et al. JACC Asia. 2024;4:519-31

Ongoing Clinical Trials

SELUTION *De Novo* Trial

SELUTION *De Novo* Trial

Trial Designs

ClinicalTrials.gov: NCT04859985

Comparing a strategy of sirolimus-eluting balloon treatment to drug-eluting stent implantation in de novo coronary lesions in all-comers: Design and rationale of the SELUTION DeNovo Trial

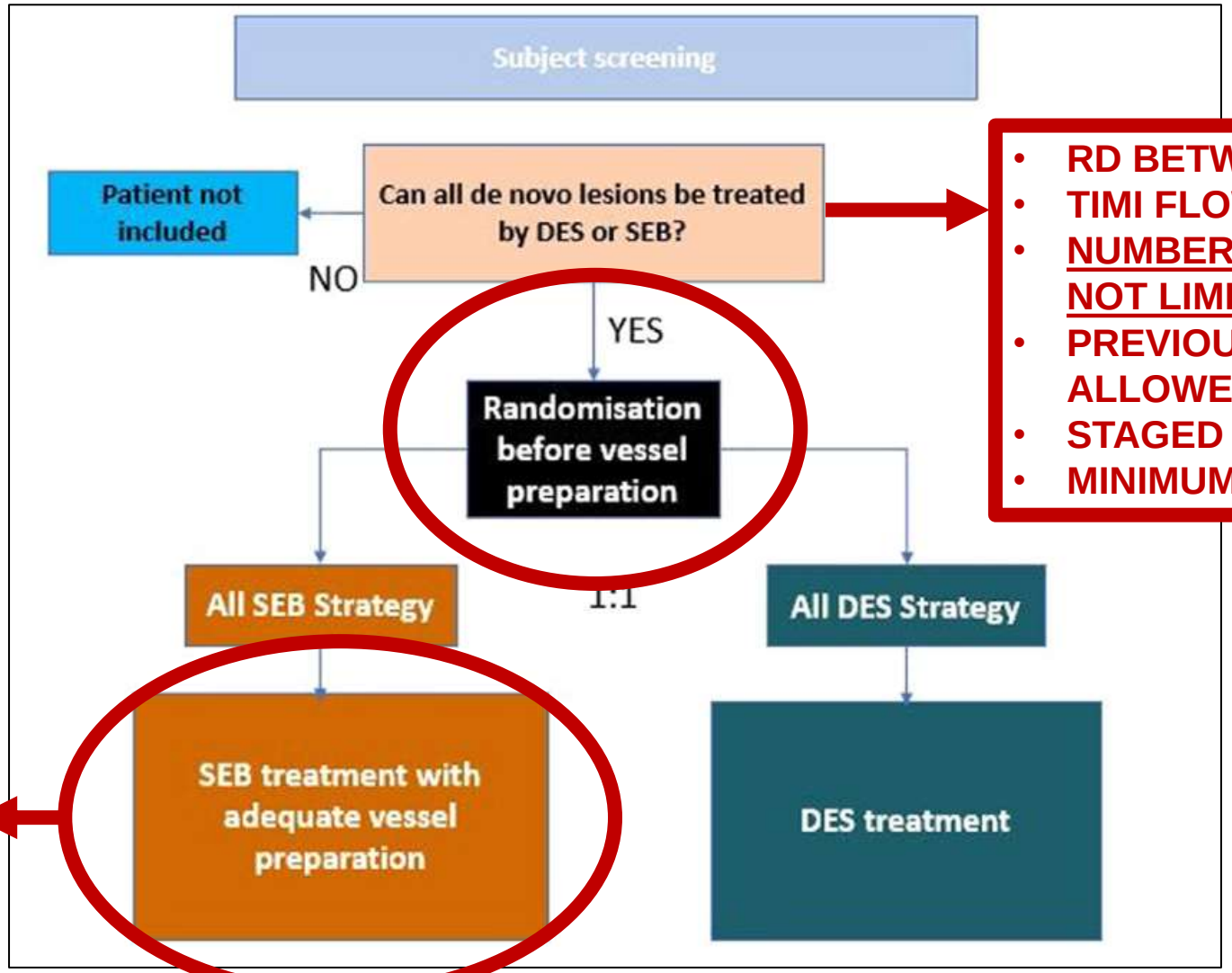
Christian Spaulding, MD, PhD [a,*], Florian Krackhardt, MD [b,*], Kris Bogaerts, PhD [c,d], Philip Urban, MD [e], Susanne Meis, BA [f], Marie-Claude Morice, MD [g], and Simon Eccleshall, MD [h] *Paris, France; Berlin, Germany*

Background Drug eluting stents (DES) are associated with a 2% to 4% annual rate of target lesion failure through 5-to-10-year follow-up. The presence of a metallic protheses is a trigger for neo-atherosclerosis and very late stent thrombosis. A "leave nothing behind" strategy using Drug Coated Balloons has been suggested; however, paclitaxel coated balloons are only recommended in selected indications. Recently a novel sirolimus eluting balloon, the SELUTION SLR ™ 014 PTCA balloon (SEB) (M.A. MedAlliance SA, Nyon, Switzerland) has been developed.

Hypothesis A strategy of percutaneous coronary intervention (PCI) with SEB and provisional DES is non-inferior to a strategy of systematic DES on target vessel failure (TVF) at one and five years. If non-inferiority is met at 5 years, superiority will be tested.

Spaulding C, et al. Am Heart J 2023;258:77–84

Study Flow



- RD BETWEEN 2 AND 5 MM
- TIMI FLOW 2 OR 3
- NUMBER OF TARGET LESIONS NOT LIMITED
- PREVIOUS PCI <30 DAYS NOT ALLOWED
- STAGED PROCEDURE <45 DAYS
- MINIMUM 30 SECONDS INFLATION

STATE-OF-THE-ART REVIEW

Drug-Coated Balloons for Coronary Artery Disease

Third Report of the International DCB Consensus Group

ABSTRACT

Spaulding C, et al. Am Heart J 2023;258:77–84

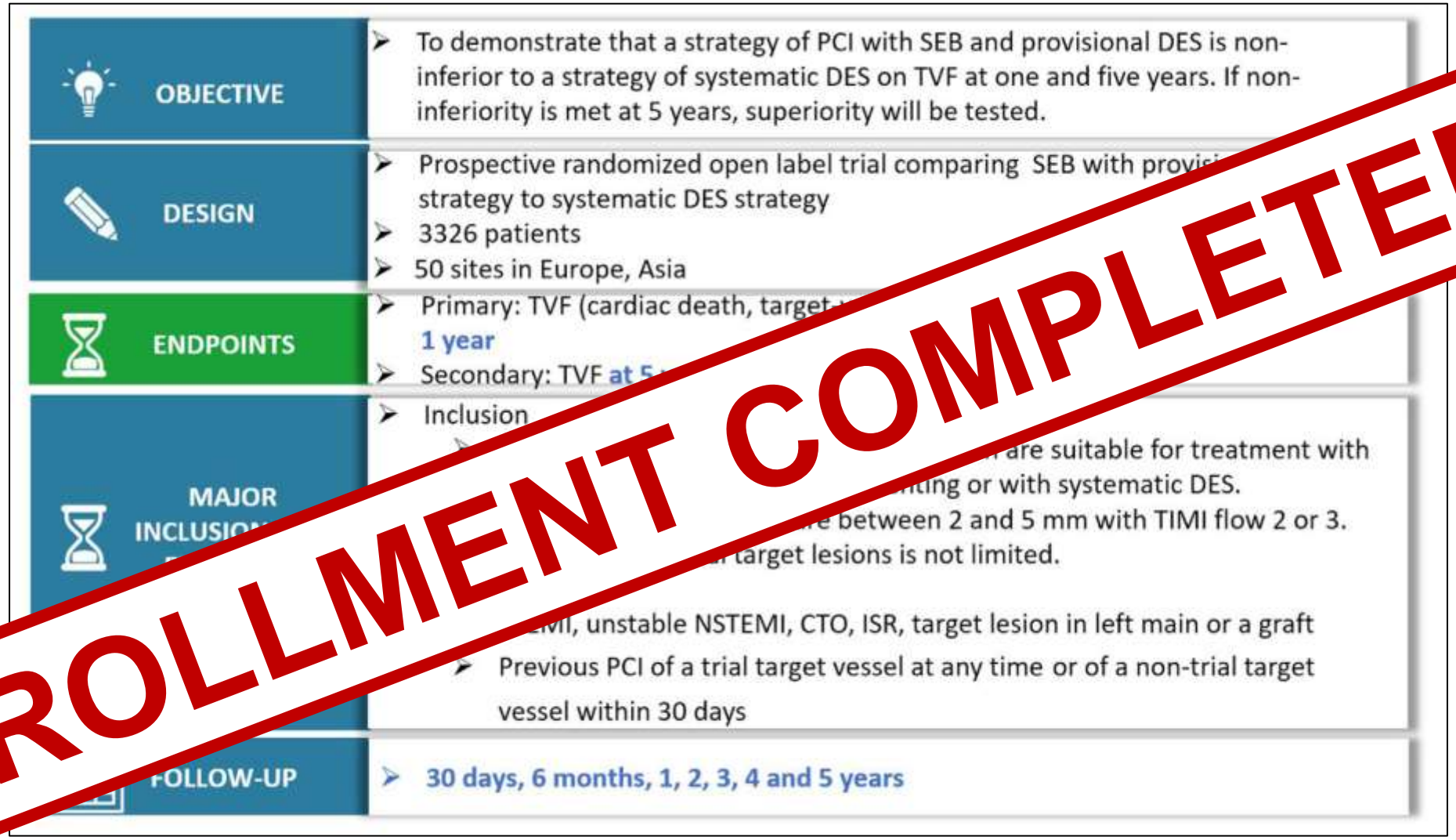
Technical Procedures for DCB

- Optimized lesion preparation
- Balloon-to-vessel ratio 1:1
- Adjunctive treatment allowed (NC high pressure, RA, lithotripsy, CB or SB)
- Criteria for crossover to DES either before or after DCB:

  1) Flow-limiting dissection
  2) Residual stenosis >30% (by visual estimation)
  3) FFR <0.8

Jeger RV, et al. J Am Coll Cardiol Intv. 2020;13:1391-402

Trial Design



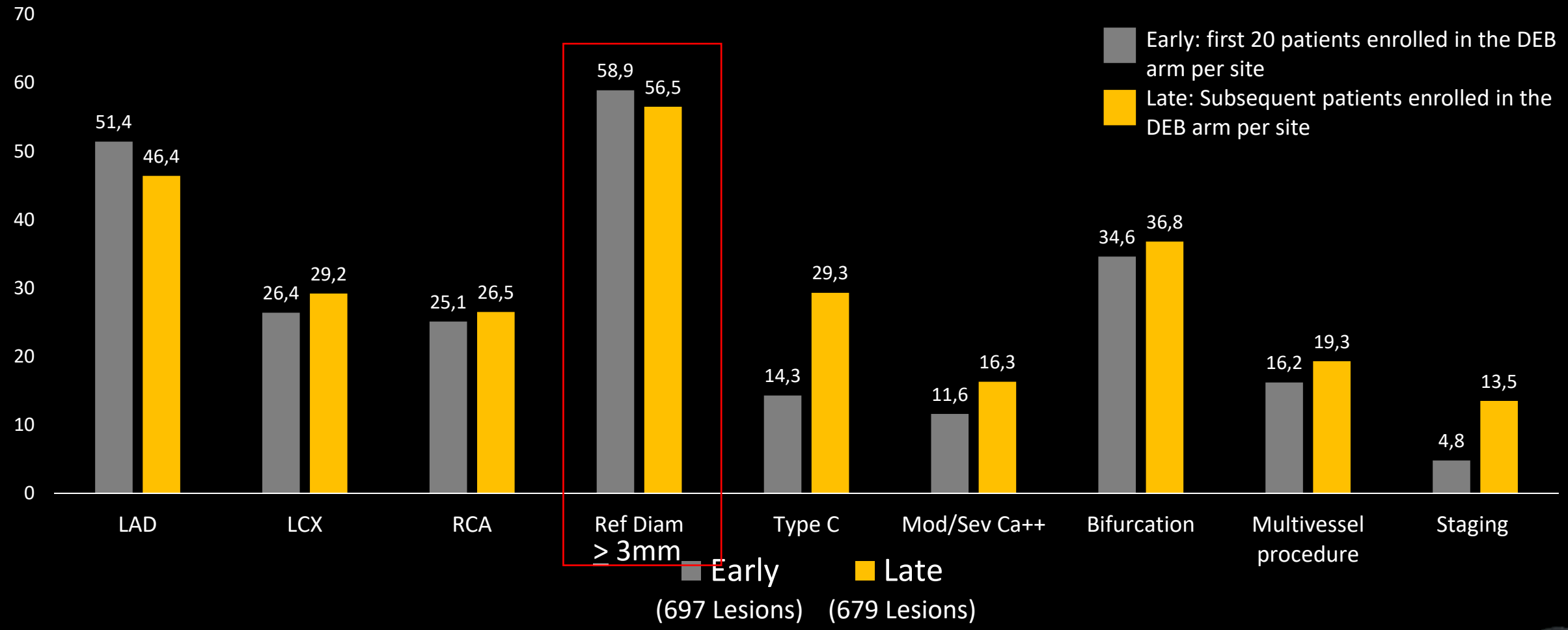
ENROLLMENT COMPLETED!!!

Spaulding C, et al. Am Heart J 2023;258:77–84

Preliminary Observations

Patients treated reflect routine PCI practice with >56% of patients with vessel diameter ≥ 3.0 mm

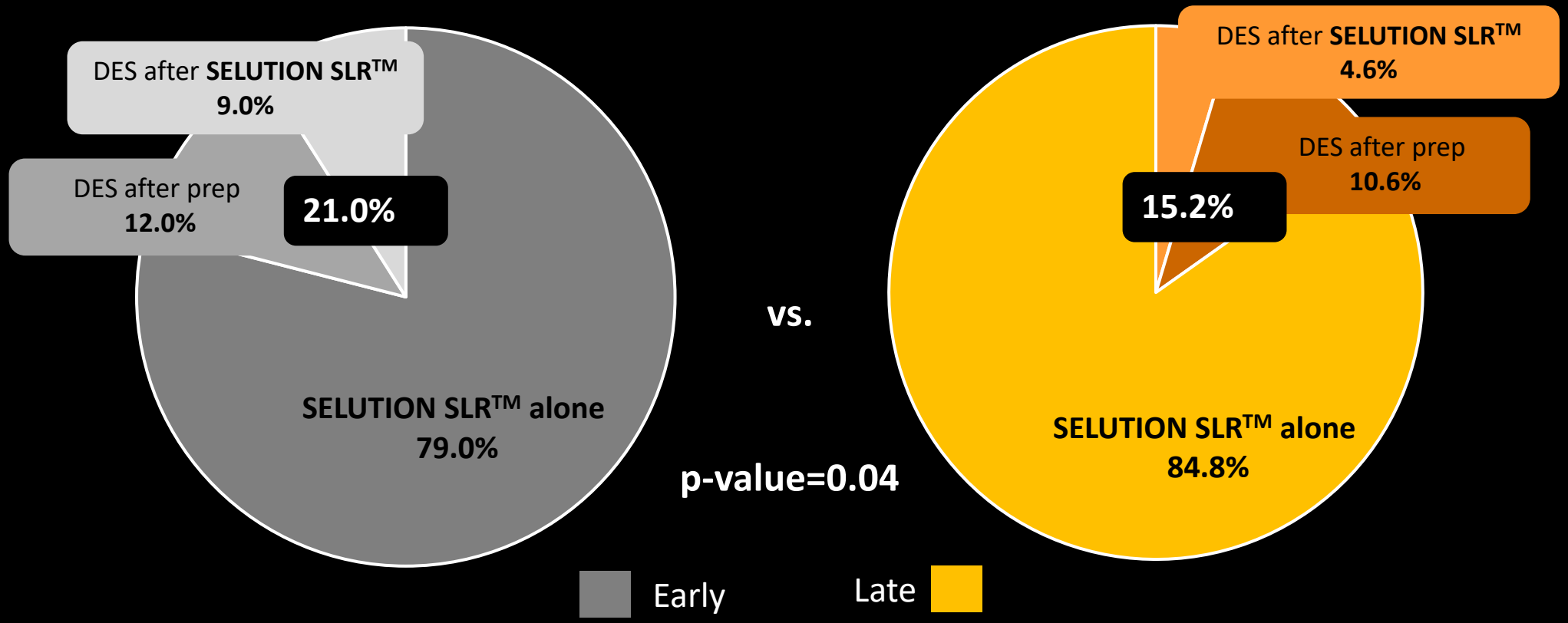
Baseline angiographic characteristics (site reported)



1. Characteristics of 1000 patients treated with SELUTION SLR™ SEB in the ongoing Selution DeNovo Trial - Eccleshall. S – EuroPCR 2024 oral presentation.
2. EU DeNovo 1000 LBT - S Eccleshall – EuroPCR 2024 oral presentation

Bail-out stent rate decreased by ~6% as centers gain more experience despite an increase in lesion and patient complexity

Rate of bail-out DES per lesion



1. Characteristics of 1000 patients treated with SELUTION SLR™ SEB in the ongoing Selution DeNovo Trial - Eccleshall. S – EuroPCR 2024 oral presentation.
2. EU DeNovo 1000 LBT - S Eccleshall – EuroPCR 2024 oral presentation

TRANSFORM II Trial

TRANSFORM II Trial

Sirolimus-coated balloon versus everolimus-eluting stent in de novo coronary artery disease: Rationale and design of the TRANSFORM II randomized clinical trial

Antonio Greco [1], Alessandro Sciahbasi [2], Alexandre Abizaid [3], Roxana Mehran [4 5], Stefano Rigattieri [6], Jose M de la Torre Hernandez [7], Fernando Alfonso [8], Bernardo Cortese [9]

Affiliations + expand

PMID: 36054266 DOI: 10.1002/ccd.30358

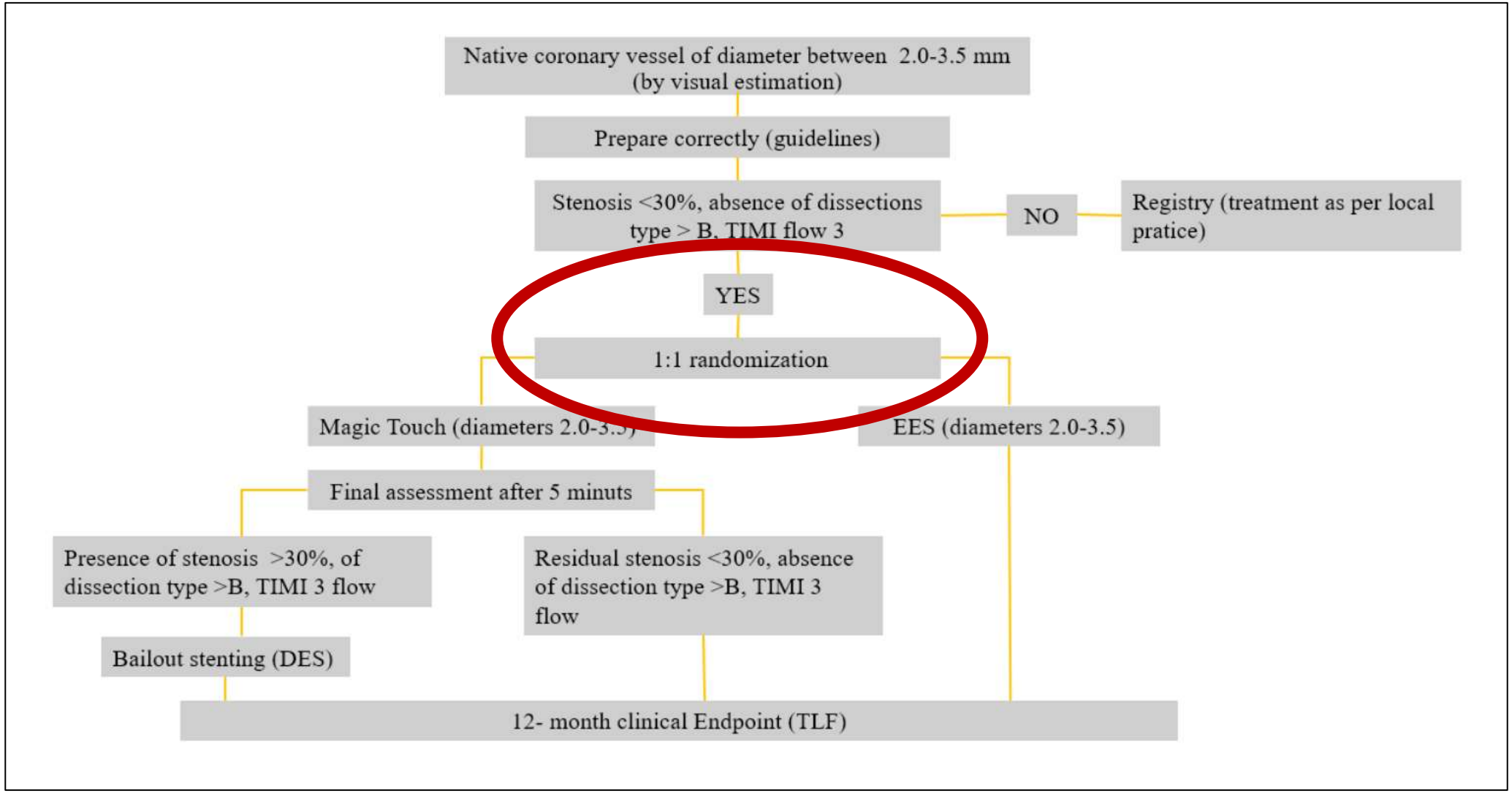
ClinicalTrials.gov: NCT04893291

Abstract

Background: Percutaneous coronary intervention (PCI) with drug-eluting stent (DES) implantation is a widely adopted strategy for the treatment of de novo coronary artery disease. DES implantation conveys an inherent risk for short- and long-term complications, including in-stent restenosis and stent thrombosis. Drug-coated balloons are emerging as an alternative approach to fulfill the "leaving nothing behind" principle and avoid long-term DES-related complications.

Greco A, et al. Catheter Cardiovasc Interv. 2022;100:544-52

Study Design



Greco A, et al. Catheter Cardiovasc Interv. 2022;100:544-52

Key Differences

SELUTION *De Novo* versus TRANSFORM II Trials

- Time of randomization (before vs. after lesion preparation)
- Number of target lesions (unlimited vs. one single lesion)
- Previous PCI in non-target vessel (> 30 days vs. index PCI)
- Target vessel RD (2.0-5.0 mm vs. 2.0 vs. 3.5 mm)
- Staged procedure (<45 days vs. not applicable)
- Primary endpoint (TVF vs. TLF)
- Number of patients (3,326 vs. 1,820)
- Enrollment (completed vs. ongoing)

Greco A, et al. Catheter Cardiovasc Interv. 2022;100:544-52

DCB in *De Novo* Lesions

- Concepts
- Techniques
- Technologies
- Lesion selection
- Optimal vessel preparation
- Recent clinical evidence
- **Recommendations**

How to Select *De Novo* Lesions?

- Situations where stents/DES do perform ideally
- Favorable anatomy
- Careful lesion preparation (provisional stenting in 20-30%)
- Inadequate result (up to 20-30%), but trend to decrease with cumulative experience