

Congreso de la **SAC24**
Sociedad Asturiana
de **Cardiología** **17 y 18 de mayo**



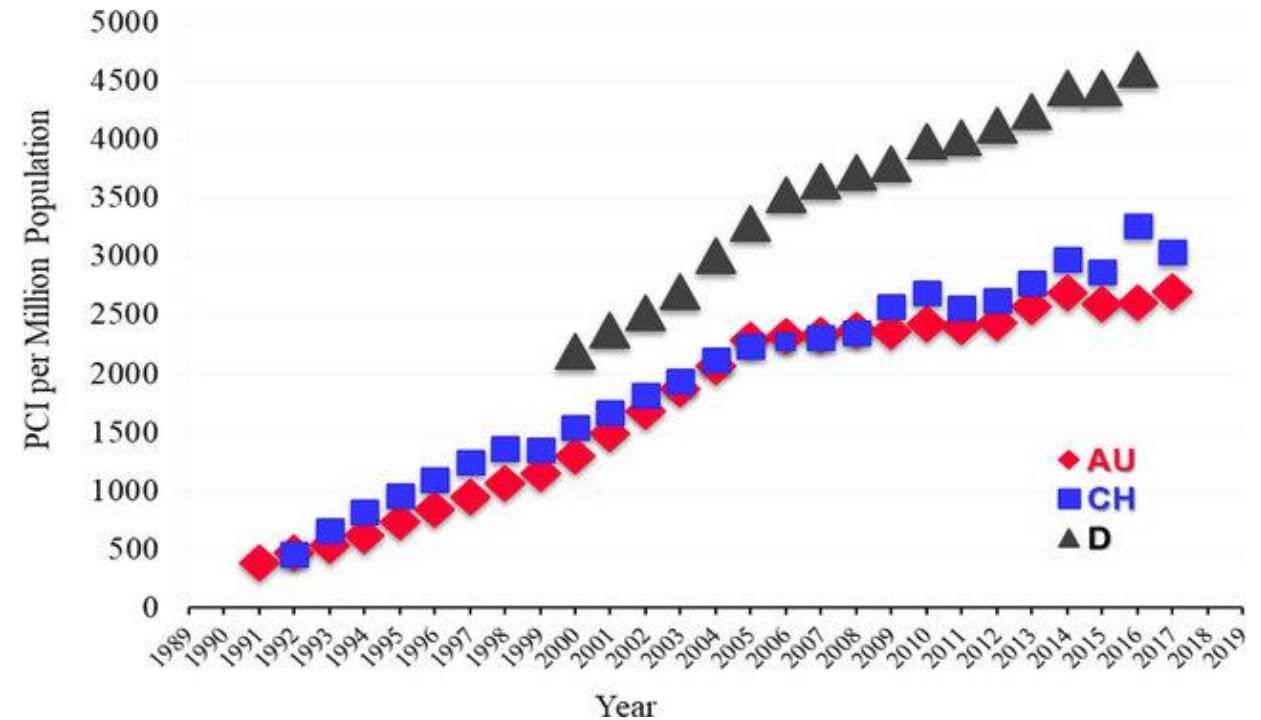
**Intervencionismo coronario en
nuestros días:
Más allá del stent**

Marcel Almendárez | *Sección de Cardiología Intervencionista*
Hospital Universitario Central de Asturias

#AsturCardio2024

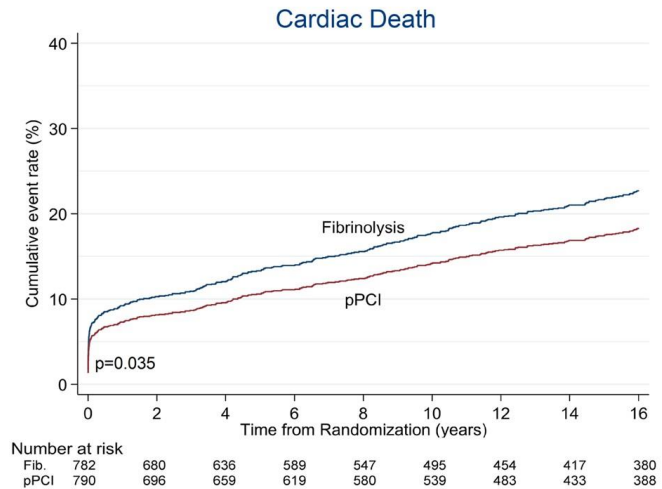
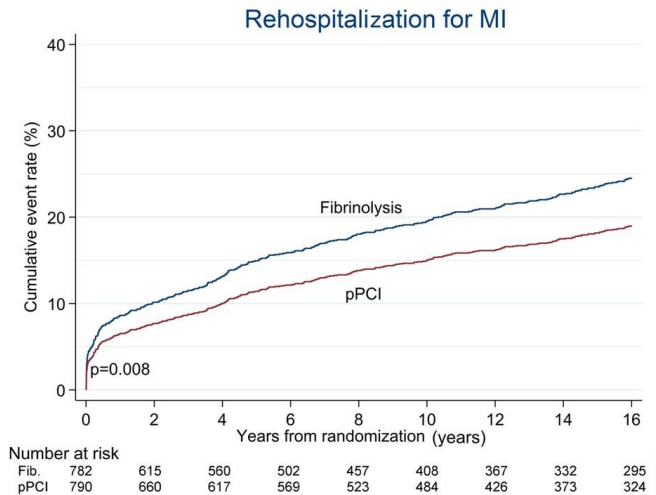
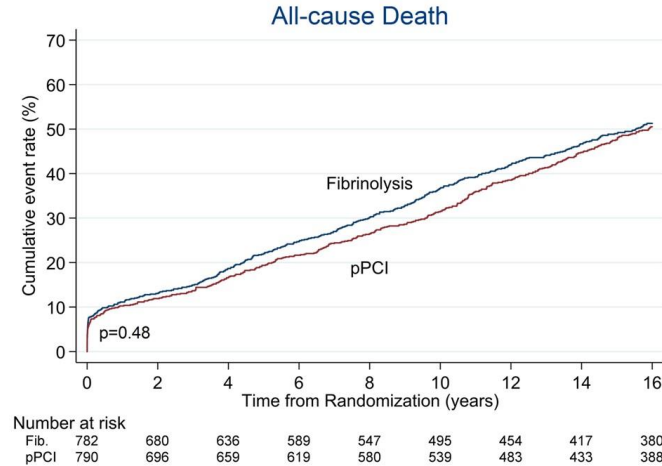
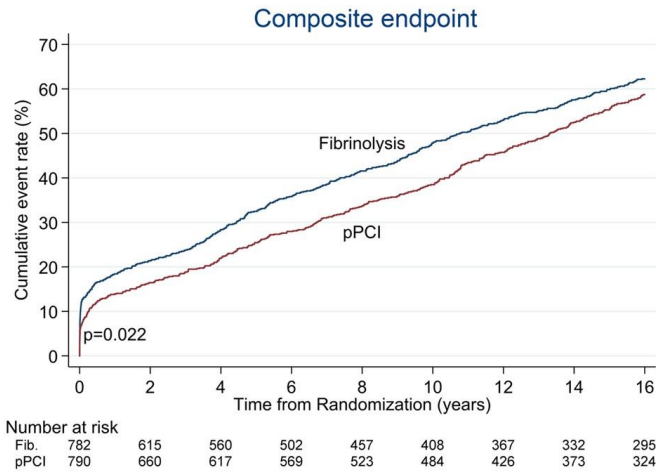
Introducción

- La EC es la patología cardiovascular más frecuente
- Aumento exponencial del manejo invasivo de la EC
- Nuevas técnicas y dispositivos favorecen los resultados



Beneficio revascularización: STEMI

DANAMI 16 años



Thrane P et al. EHJ. 2020.

Metaanálisis ICP frente a fibrinólisis.

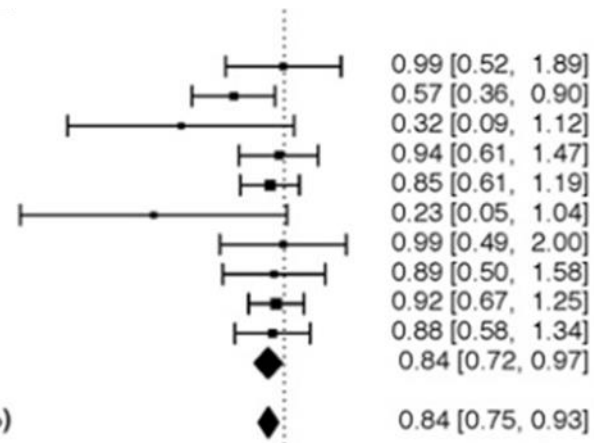
Resultado	OR (IC 95%)	P
Muerte	0,73 (0,61-0,89)	0,002
IAM	0,38 (0,29-0,5)	<0,001
Ictus	0,38 (0,24-0,60)	<0,001

Fazel R et al. JAHA. 2020

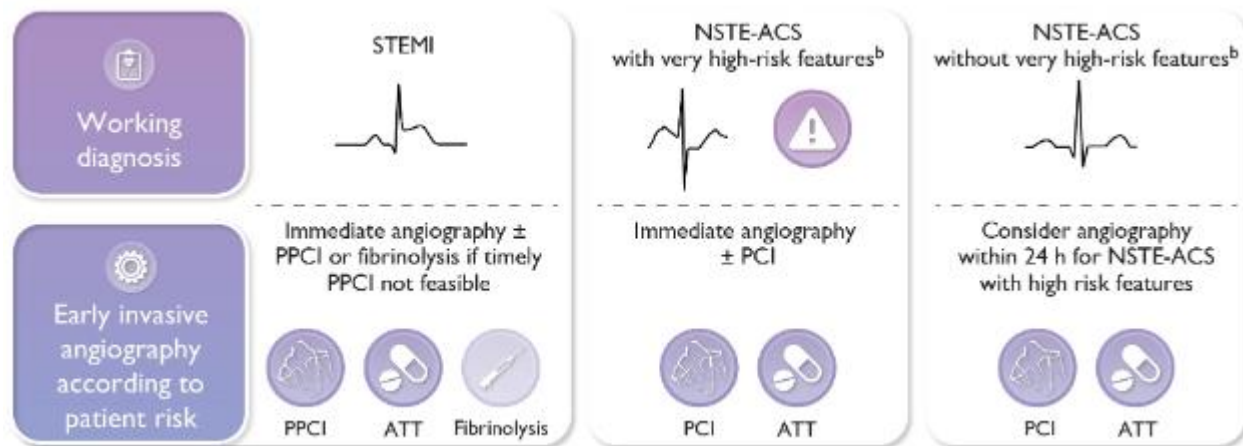
Beneficio revascularización: NSTEMI

Unstable CAD – NSTEMACS

TIMI IIIB, 1994	18	740	18	733
FRISC II, 2000	27	1222	48	1234
TRUCS, 2000	3	76	9	72
TACTICS 18, 2001	37	1114	39	1106
RITA 3, 2002	60	895	72	915
VINO, 2002	2	64	9	67
ICTUS, 2005	15	604	15	596
Savonitto, 2012	19	154	22	159
After 80, 2016	57	229	62	228
Sanchis, 2016	22	52	26	54
NSTEMI studies ($p = 0.02$, $Q = 8.95$, $df = 9.00$, p for heterogeneity = 0.44; $I^2 = 0.0\%$)				

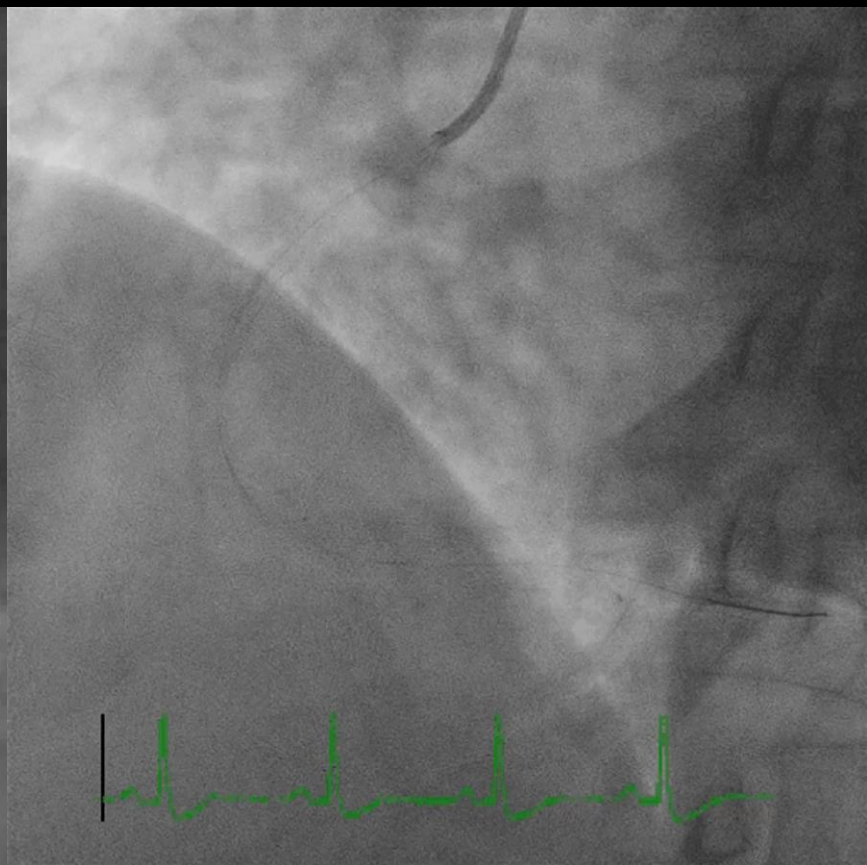
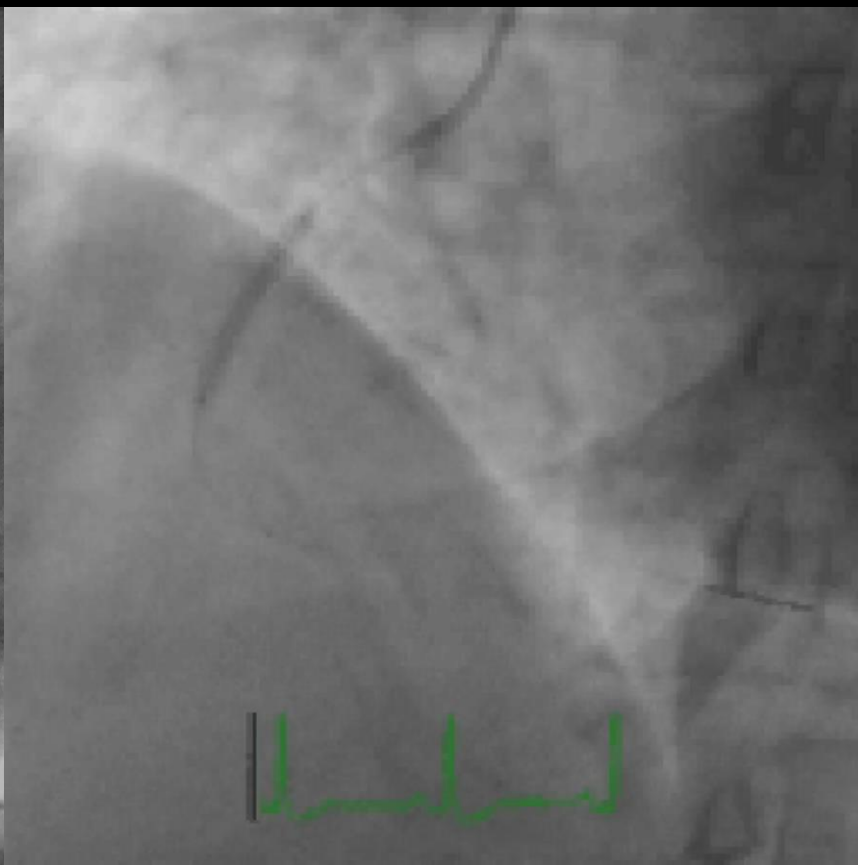
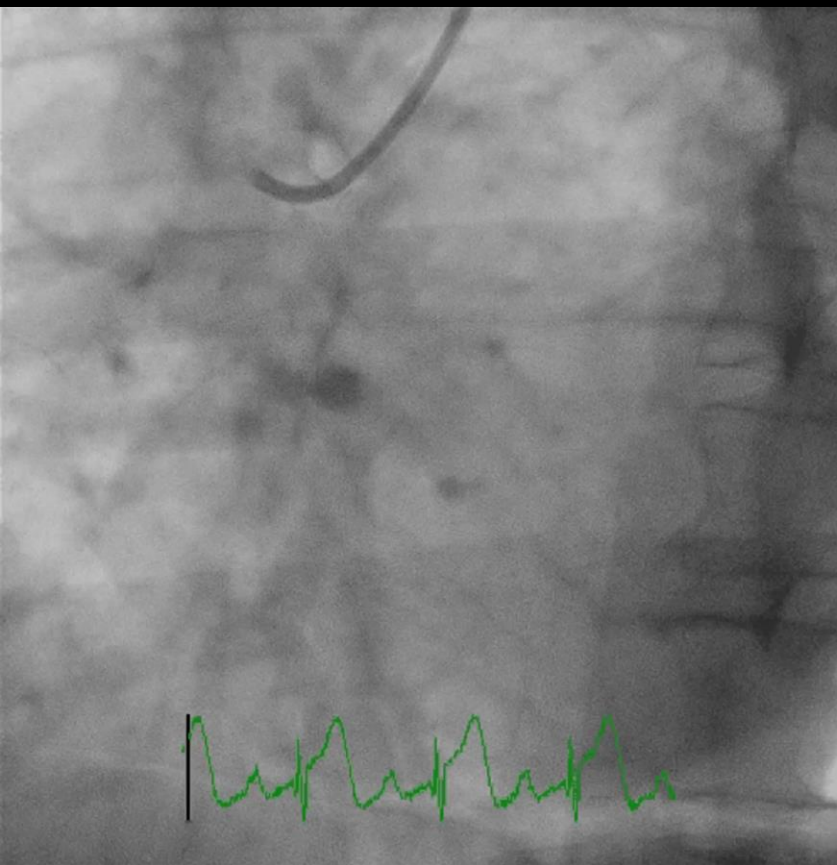


Unstable CAD studies ($p = 0.001$, $Q = 30.88$, $df = 30.00$, p for heterogeneity = 0.42; $I^2 = 0.0\%$)

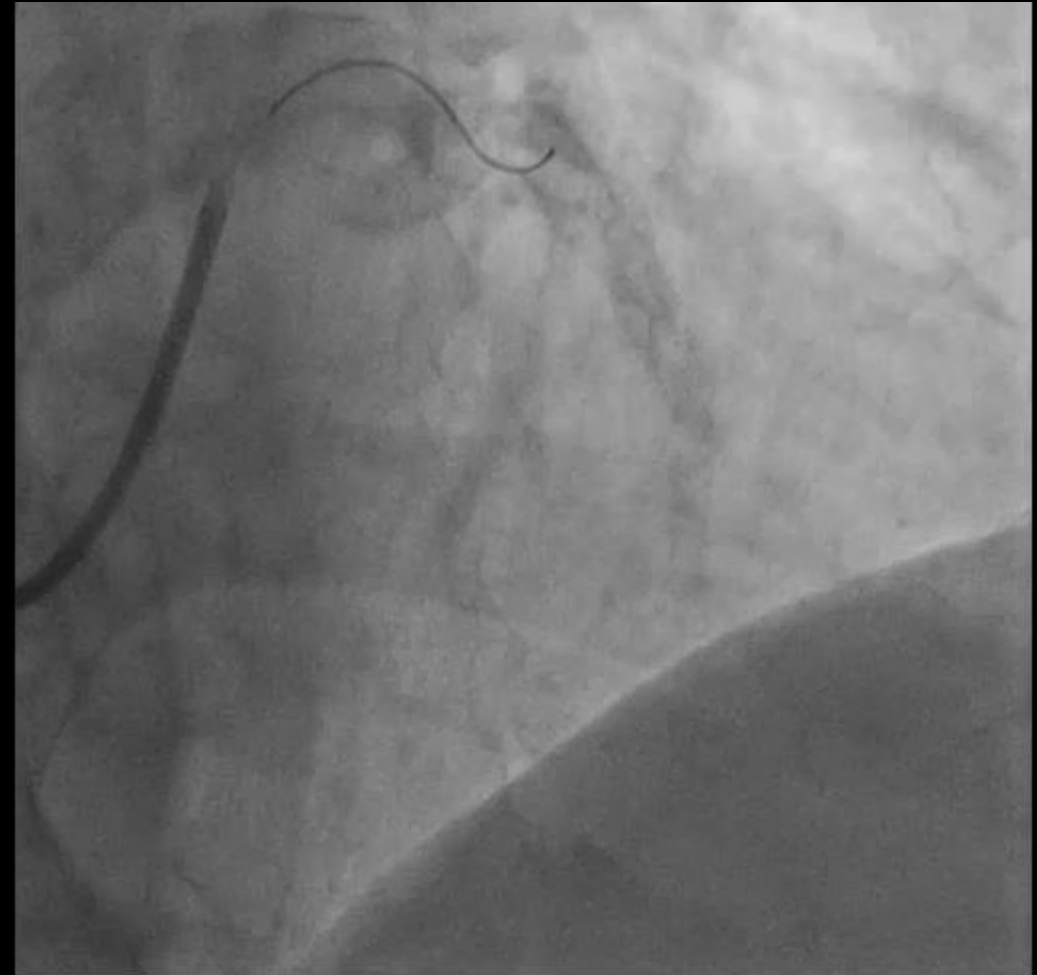
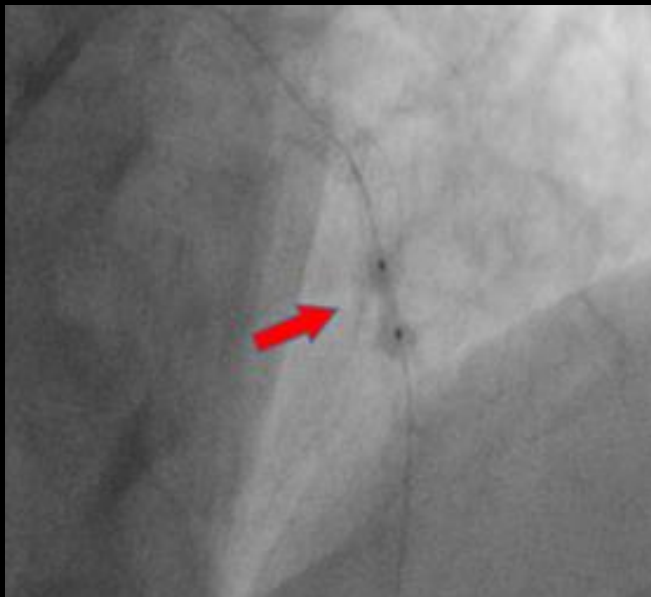


Beneficio claro de la revascularización en escenarios agudos

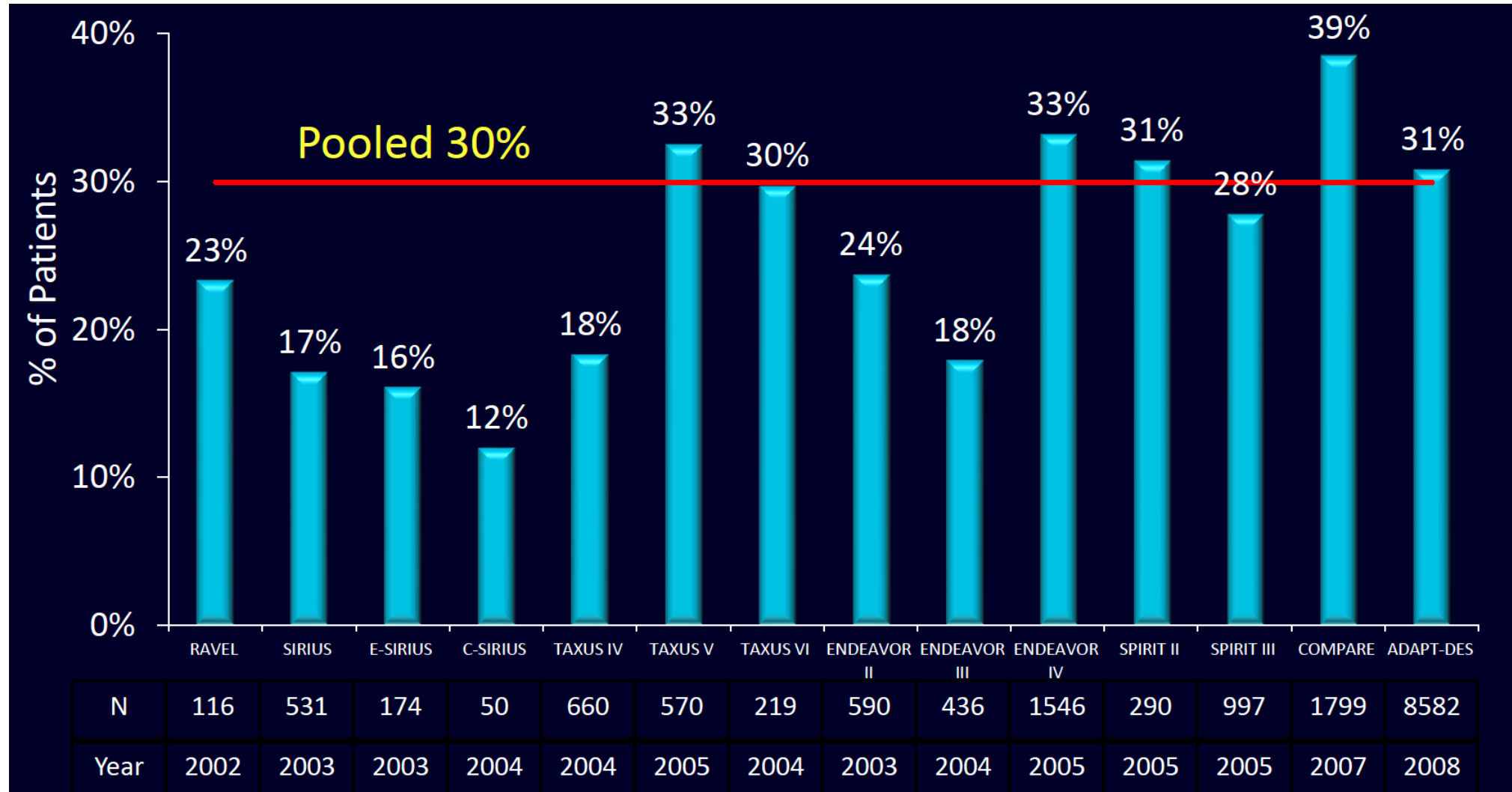




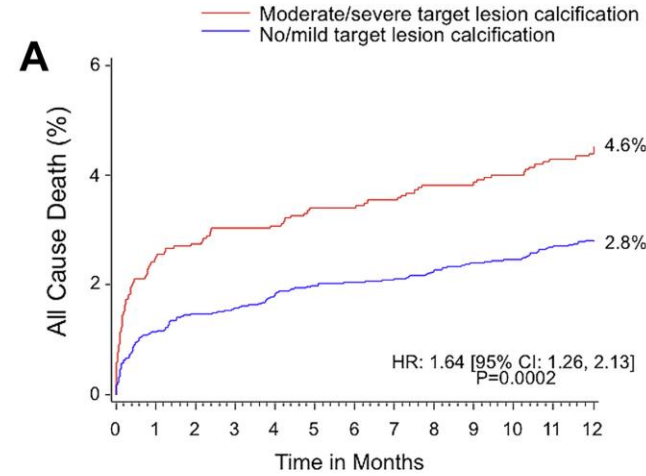
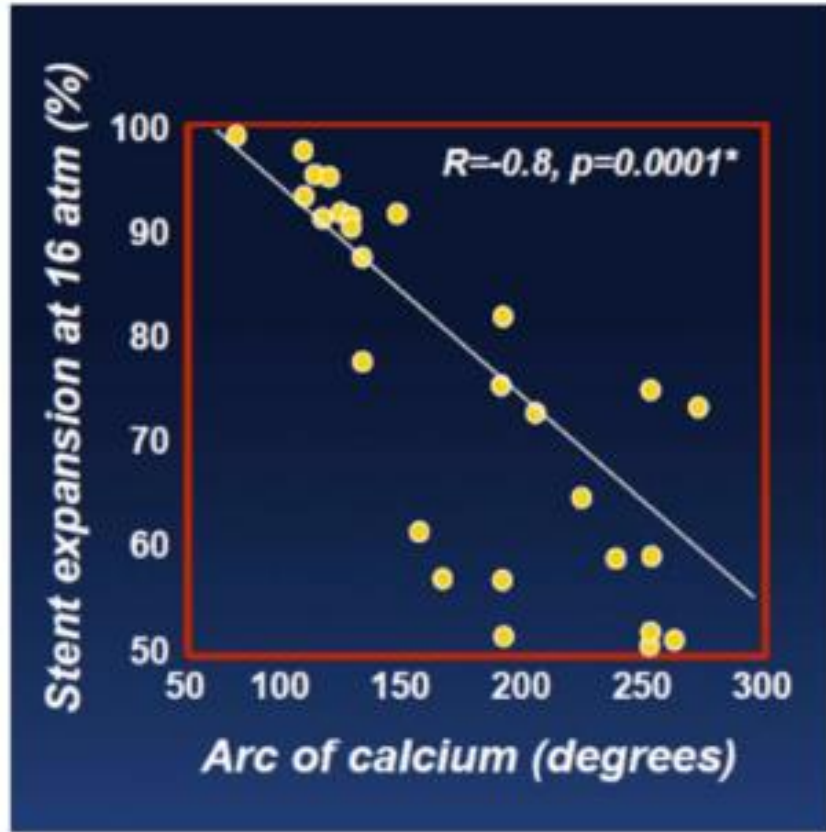
No todo es implantar un stent directo...



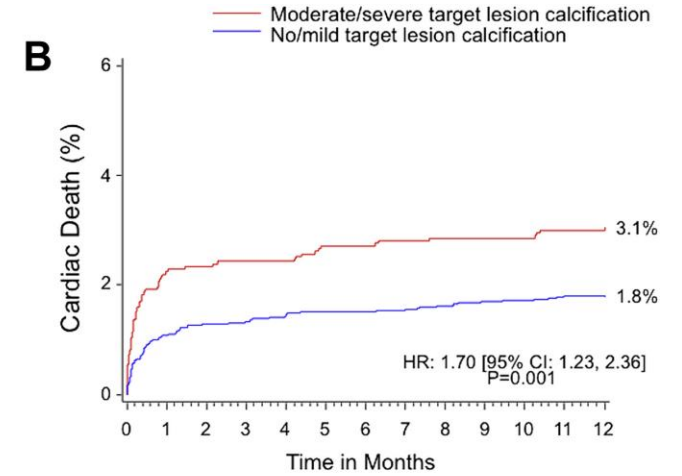
Presencia de calcio lesión culpable



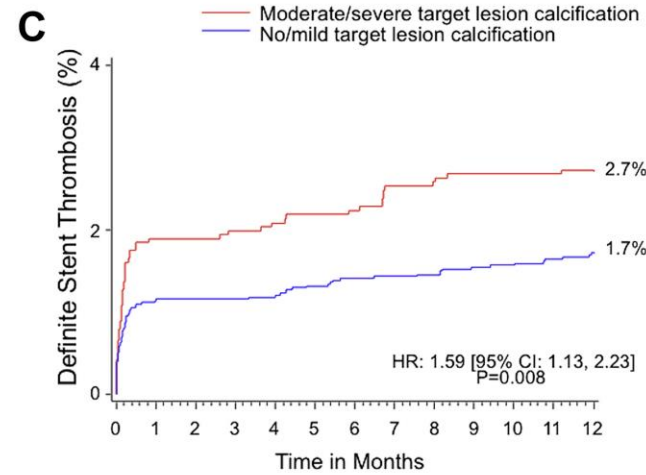
El calcio marca el pronóstico



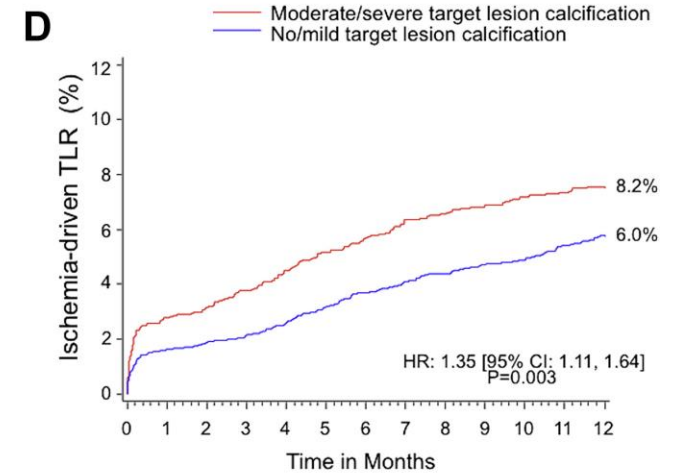
Number at risk					
Moderate/severe	2190	2082	2049	1744	
No/Mild	4665	4460	4415	3588	



Number at risk					
Moderate/severe	2190	2082	2049	1744	
No/Mild	4665	4460	4415	3588	



Number at risk					
Moderate/severe	2139	2001	1961	1665	
No/Mild	4607	4358	4302	3477	



Number at risk					
Moderate/severe	2190	1991	1921	1624	
No/Mild	4665	4349	4224	3389	

¿Como afrontar estas lesiones?

*Criteria for Ca Modification:

- 360° arc of calcium
- >270° arc of calcium and >5 mm length of calcium

Additional characteristics of calcified lesions that may require calcium modification:

- Calcified nodule
- Lesion EEL <3.5 mm or Negative remodeling (Lesion EEL diameter <distal EEL diameter)
- Minimum thickness of calcium >0.5 mm (OCT)

SCAI

Angiographic Evidence of Calcified Coronary Lesion

Intravascular Imaging to Evaluate Criteria for Calcium Modification*

Intravascular Imaging Not Feasible or Imaging Criteria Not Met

Considerations

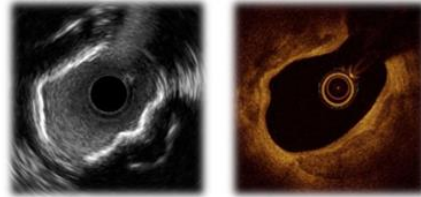
- α Long, diffuse calcium with or without nodular calcium
- β Concentric, eccentric, or nodular calcium
- γ Focal calcium

Intravascular Imaging Criteria Met

EURO4C

Moderate or severe calcification detected on angiography or CCTA

Imaging catheter crossing



Yes

No

Predilatation

Crossability of small balloon

Yes

No

Intracoronary imaging assessment*

OCT calcium score >3

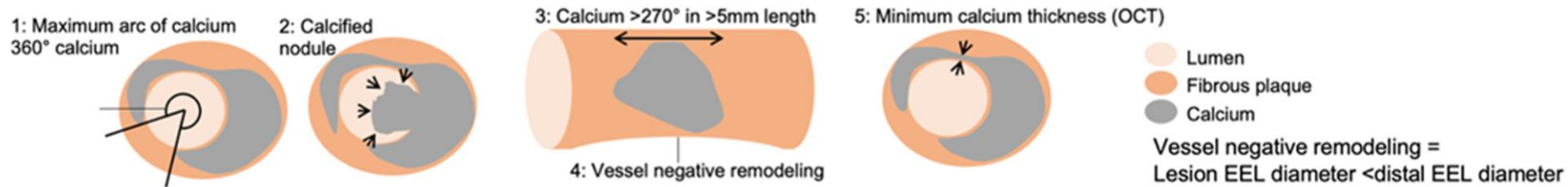
IVUS calcium score ≥ 2

Calcium Arch > 180° (2 points)
Calcium Length > 5 mm
Calcium Thickness > 0.5 mm

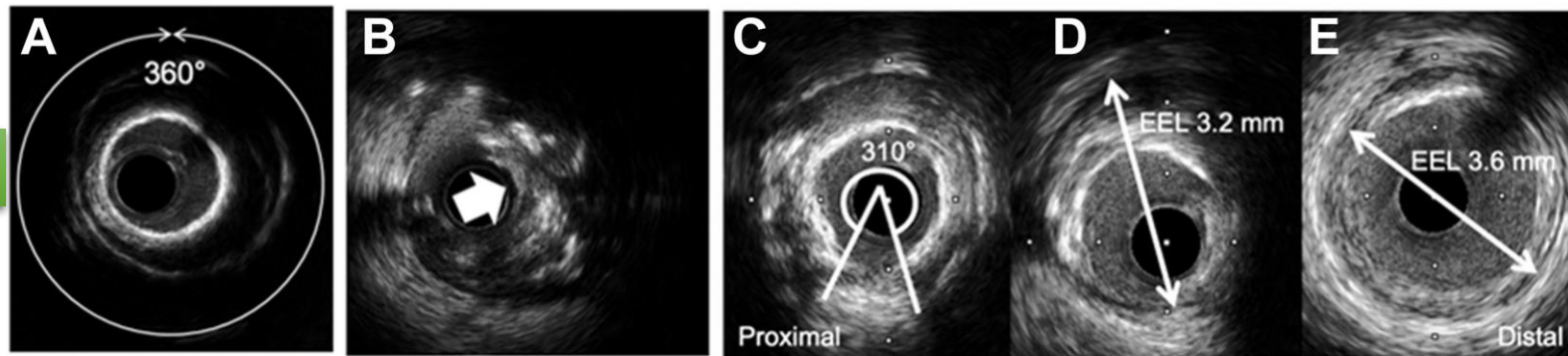
Circumferential Calcium 360°
Calcium > 270° with length of ≥5mm
Vessel diameter < 3.5mm
Calcified nodule

Angiographic Criteria
 Fluoroscopic radiopacities noted without cardiac motion prior to contrast injection involving both sides of the arterial wall in ≥ 1 location and total length of calcium of ≥ 15 mm

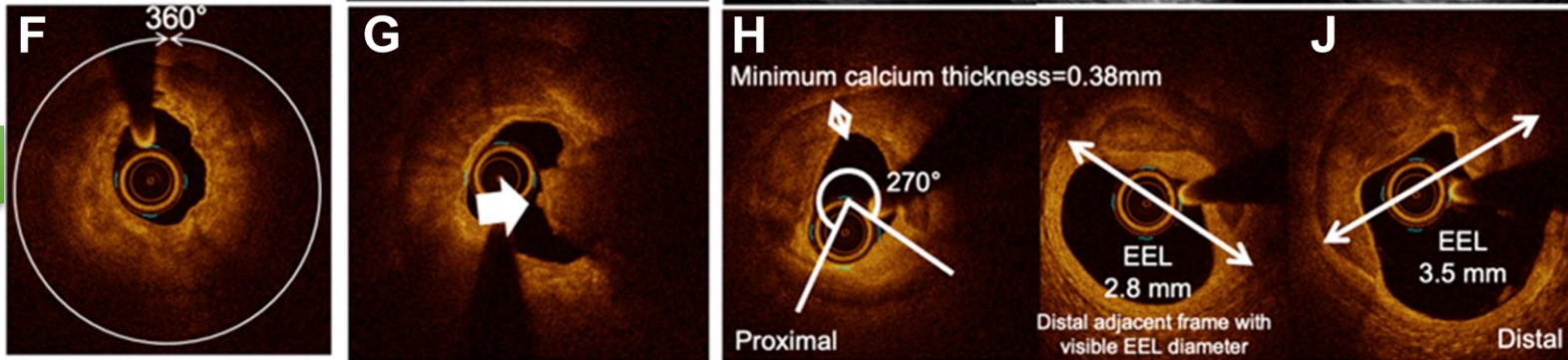
Intravascular Imaging Criteria



IVUS



OCT



IVUS

Interventions

IVUS

1753 Patients



Angiography

1752 Patients



Endpoints

Primary

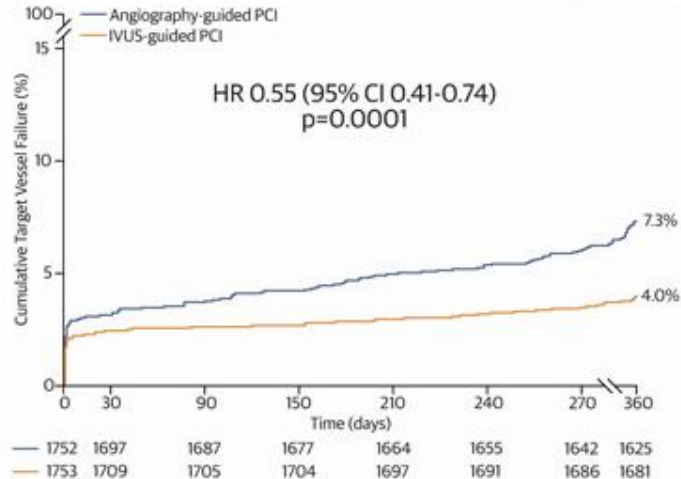
1-Year Target Vessel Failure (TVF)

Composite of cardiac death, target vessel myocardial infarction [TVMI], or clinically driven target vessel revascularisation [CD-TVMI]

Secondary

Individual components of the primary endpoint, TVF without procedural myocardial infarction, target lesion revascularisation, major bleeding (BARC 3 or 5), definite or probable stent thrombosis (ARC)

Primary Results



Single components of the primary endpoint of TVF



OCT

RANDOMIZED CONTROLLED STUDY

INTERVENTION
OCT-guided PCI

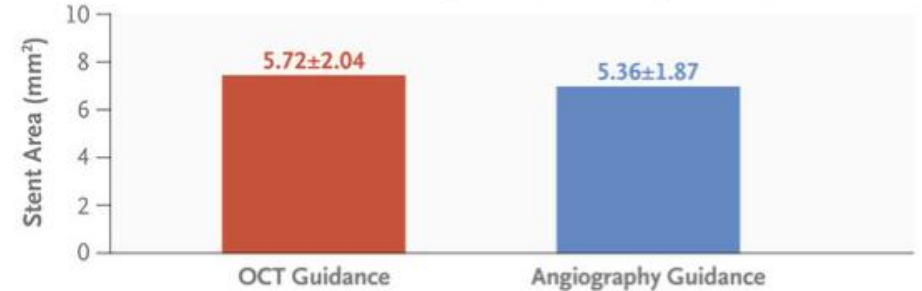


COMPARATOR
Angiography-guided PCI

Prospective, randomized, single-blind trial; 80 sites across 18 countries; 2487 patients randomized; 1233 assigned to intervention; 1254 assigned to comparator

Minimum Stent Area after PCI

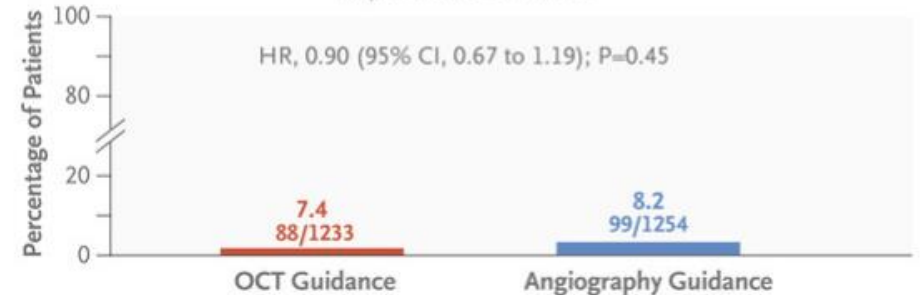
Mean difference, 0.36 mm² (95% CI, 0.21 to 0.51); P<0.001



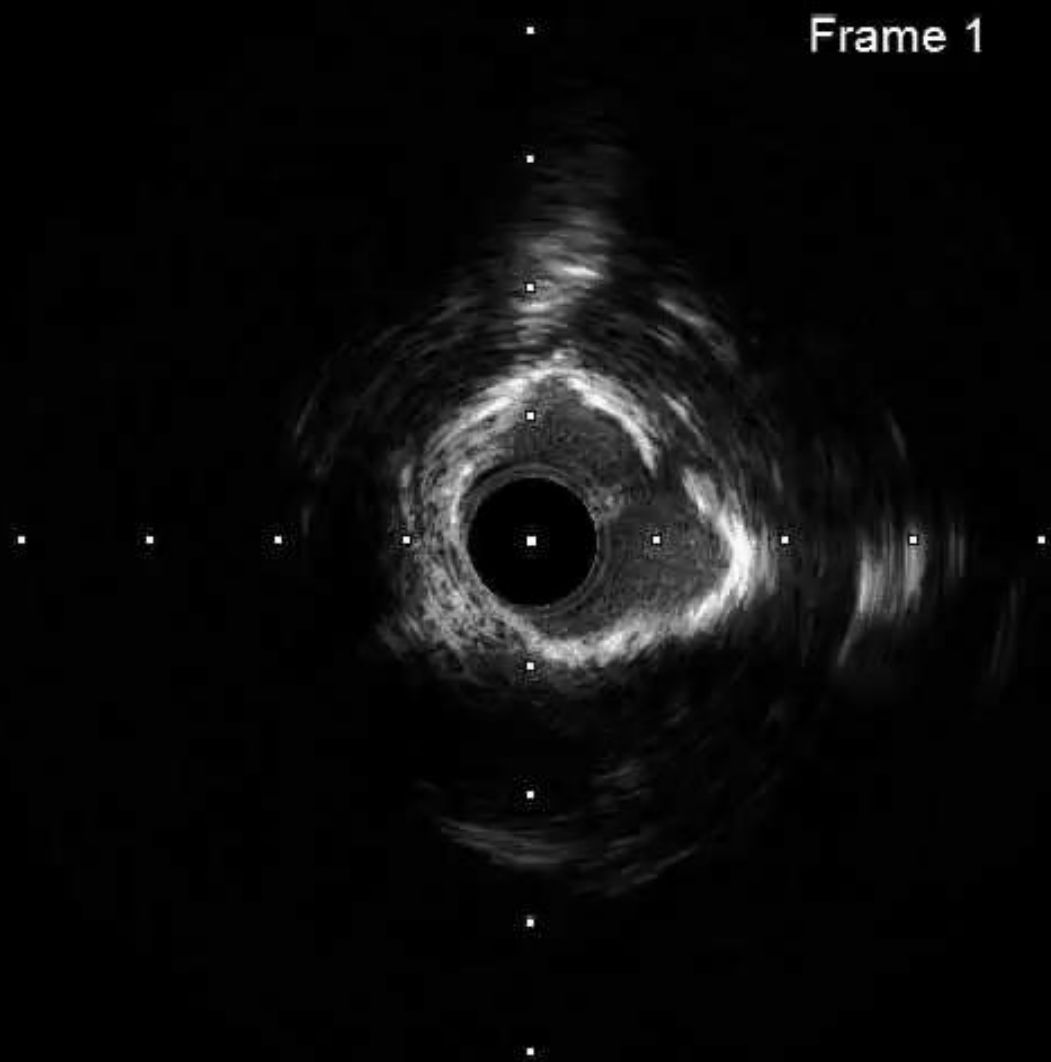
Target-Vessel Failure at 2 Yr

Kaplan-Meier estimates

HR, 0.90 (95% CI, 0.67 to 1.19); P=0.45







Algorithm with intravascular imaging guidance

Moderate or severe calcification detected on angiography or CCTA

Balones modificados

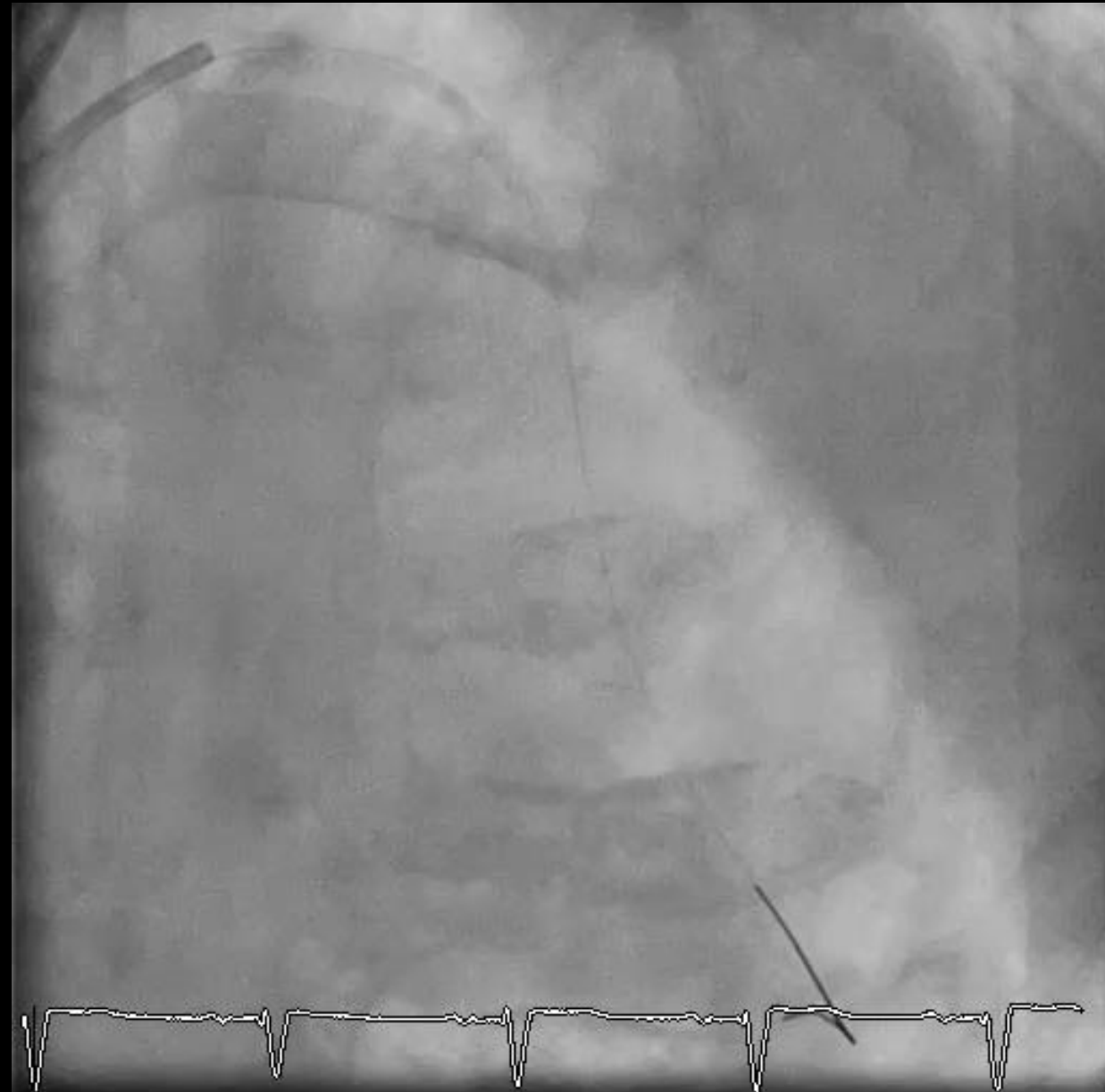
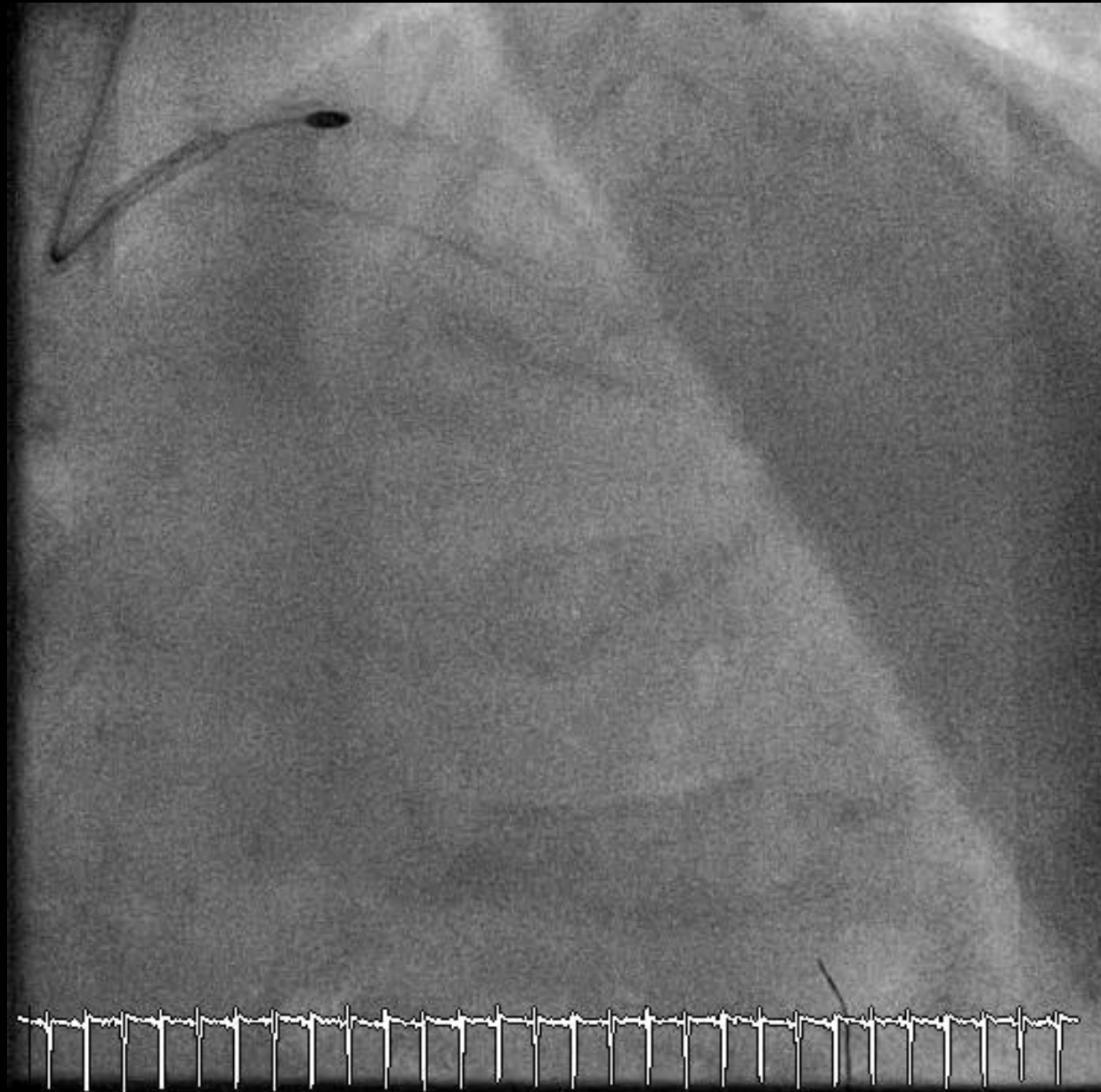


Técnicas ablación

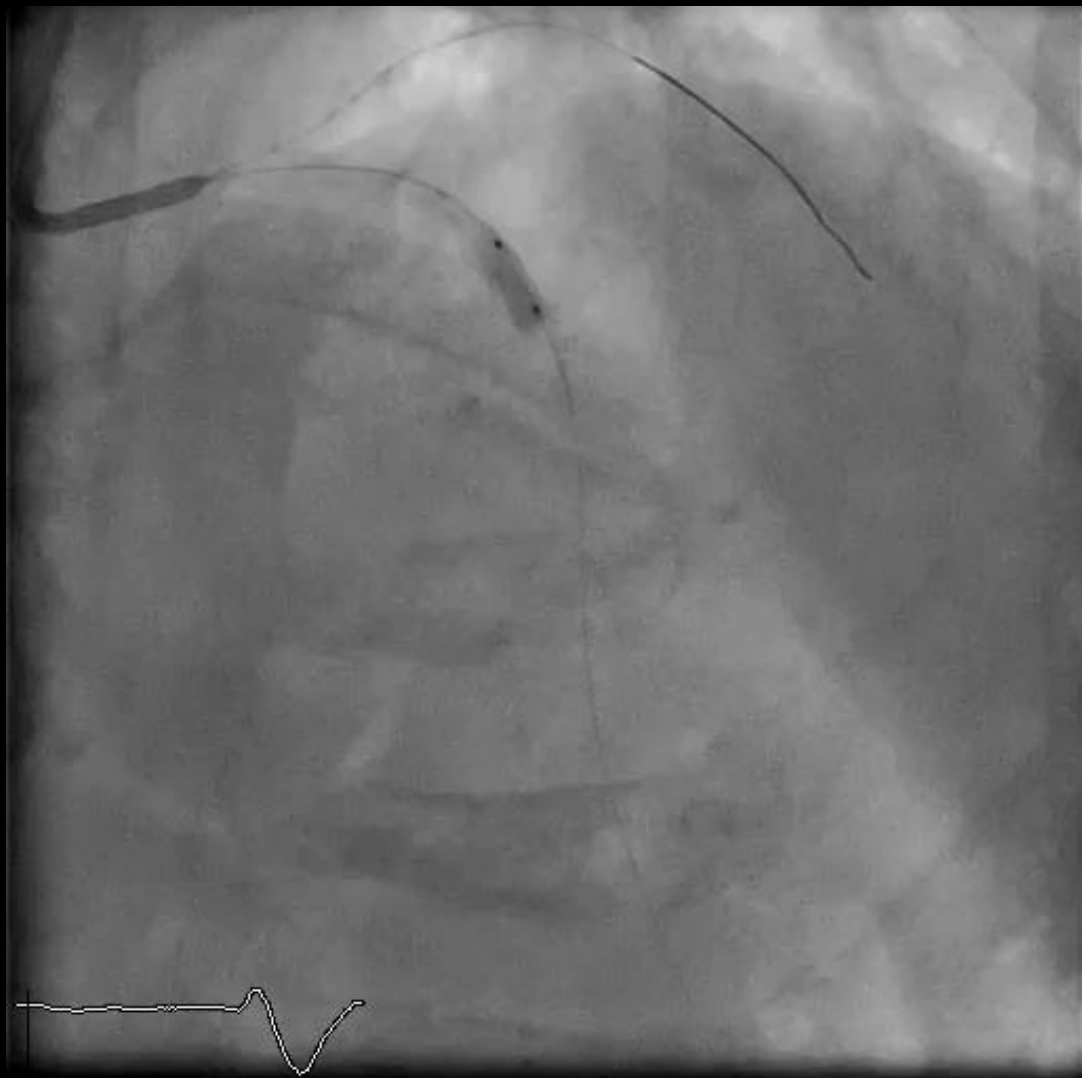


Calcium fracture or acceptable lumen gain on repeat IVUS/OCT ?

RotaPro 1,75 mm/ 160K.

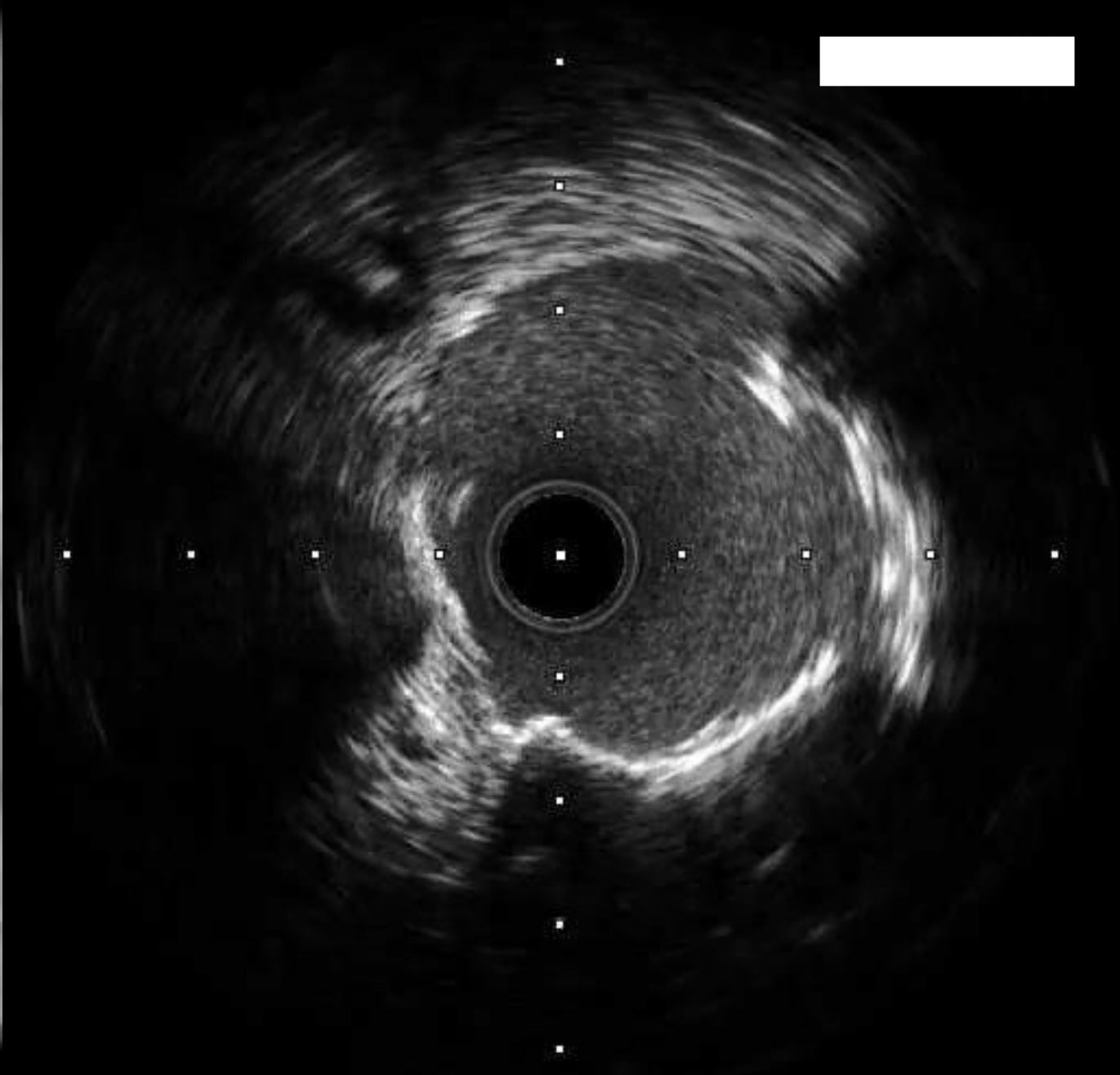


Wolverine 3,5/10 mm



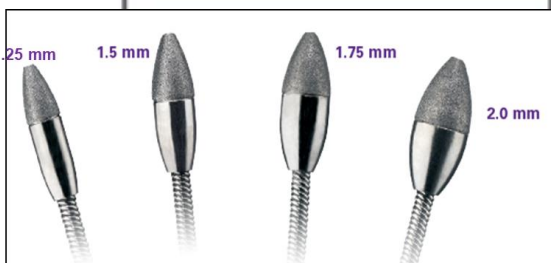
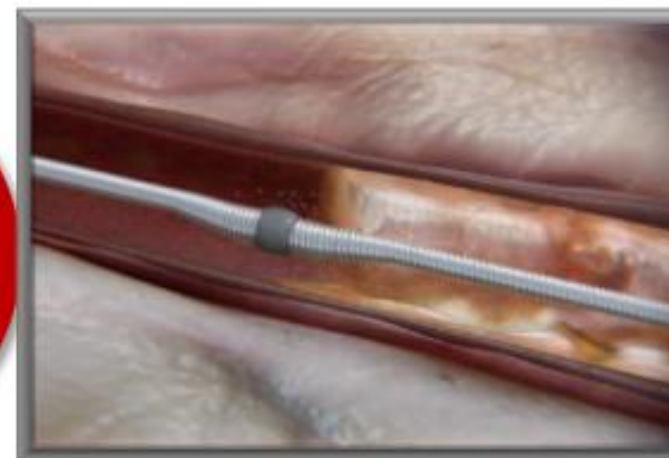
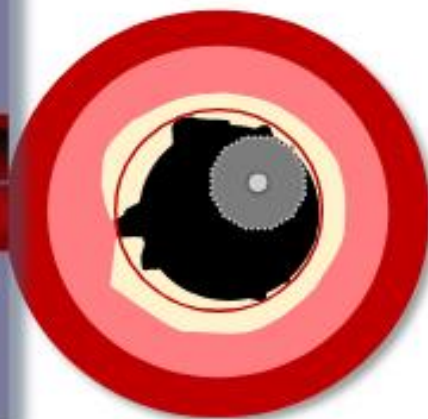
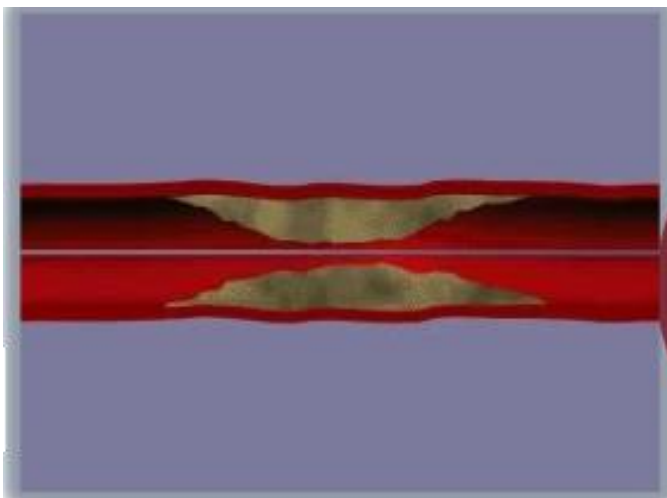
Emerge NC 3,5/20 mm







Tipos de aterectomía



Rotacional

- Unidireccional, ablación anterógrada
- Montada de forma concéntrica.
- Luz del tamaño de la oliva

Orbital

- Ablación bidireccional
- Montada de forma excéntrica.
- Corona única de 1.25mm que trata vasos 1.25-4mm

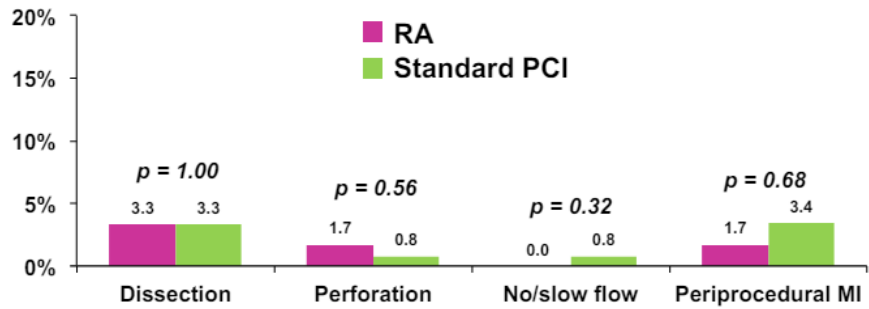


Rotacional

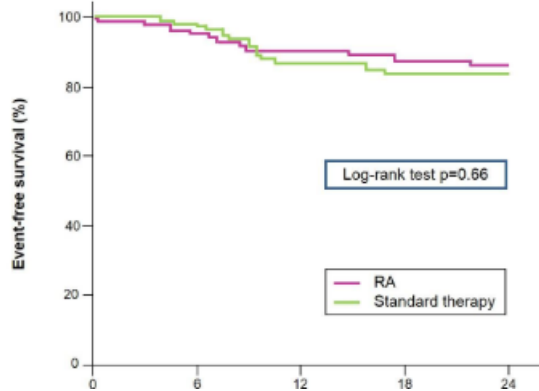
ROTAXUS

240 pacientes. Calcio moderado/severo. Aleatorización 1:1

Rotablator Angioplastia con balón



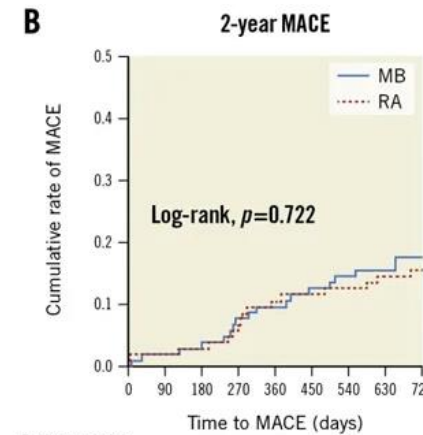
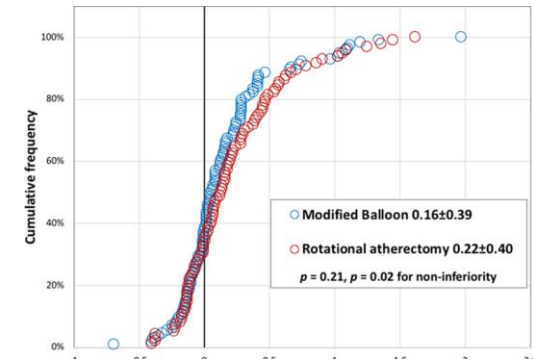
Time-dependent occurrence of TLR



PREPARE-CALC

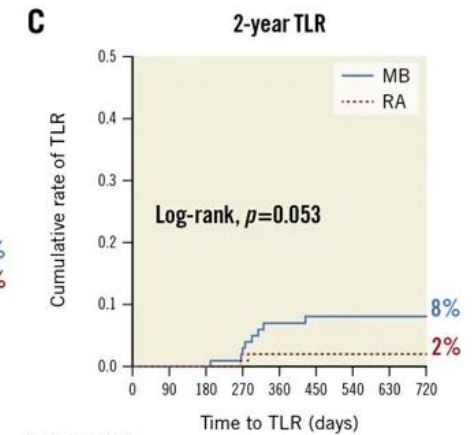
200 pacientes. Calcio severo. Aleatorización 1:1

Rotablator Scoring/cutting



Patients at risk

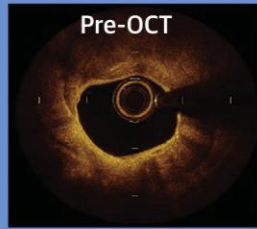
MB	100	98	96	92	90	88	85	84	81
RA	100	98	97	94	90	88	87	85	84



Patients at risk

MB	100	99	98	96	91	89	86	86	84
RA	100	99	99	97	94	93	93	92	91

- Maximal calcification arc $\geq 180^\circ$ by OCT examination, or
- Moderate or severe calcification by angiography, when the OCT catheter could not be advanced distal to the lesion

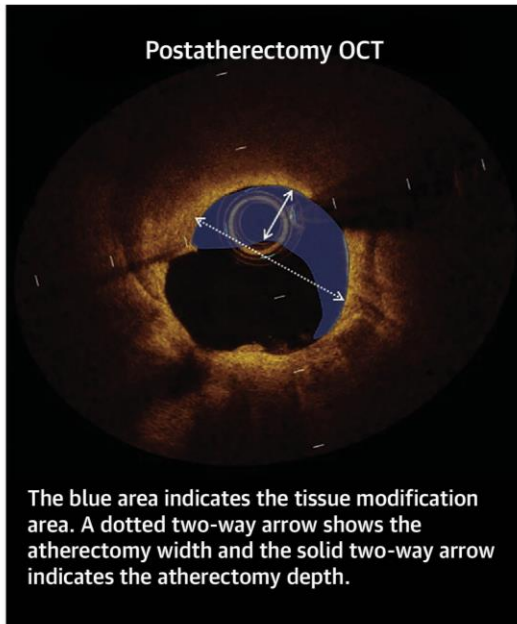


Rotacional vs Orbital

Rotational atherectomy
(n = 50)

Randomization 1:1

Orbital atherectomy
(n = 50)



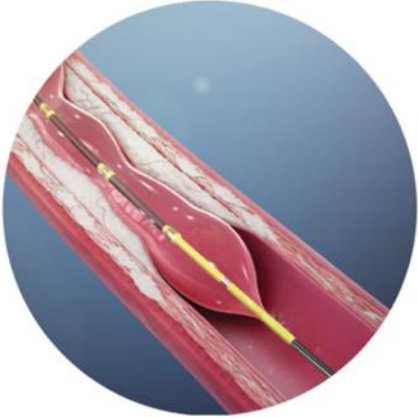
The blue area indicates the tissue modification area. A dotted two-way arrow shows the atherectomy width and the solid two-way arrow indicates the atherectomy depth.

	RA	OA	P Value
Maximum tissue modification area, mm ²	1.24 (0.84-1.74)	0.89 (0.59-1.11)	<0.01
Atherectomy width, mm	1.50 (1.32-1.89)	1.22 (1.12-1.40)	<0.01
Atherectomy depth, mm	0.54 (0.39-0.83)	0.55 (0.31-0.73)	0.62
Percentage of lumen area increase, %	72.2 (49.0-98.3)	39.2 (17.0-48.1)	<0.01
Ratio of atherectomy width to burr size	0.94 (0.79-0.98)	0.98 (0.89-1.12)	0.03
Stent expansion assessed by distal reference, %	99.5 (89.3-107.3)	90.6 (80.0-102.3)	0.02
Stent expansion assessed by mean reference, %	72.2 (60.6-86.3)	64.1 (54.0-77.7)	0.05

- Procedural outcomes including periprocedural MI were comparable
- Clinical outcomes at 8 months were similar

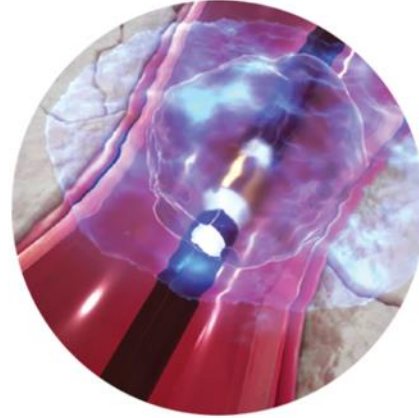
	RA (n = 50)	OA (n = 49)	P Value
All-cause death	2 (4)	2 (4)	1.00
Cardiovascular death	1 (2)	1 (2)	1.00
Noncardiovascular death	1 (2)	1 (2)	1.00
Myocardial infarction	1 (2)	1 (2)	1.00
Target lesion revascularization	3 (6)	2 (4)	1.00
Target vessel revascularization	5 (10)	2 (4)	0.44
Major bleeding	7 (14)	3 (6)	0.32
Definite stent thrombosis	1 (2)	0 (0)	1.00
Stroke	0 (0)	2 (4)	0.24

Litotricia intracoronaria



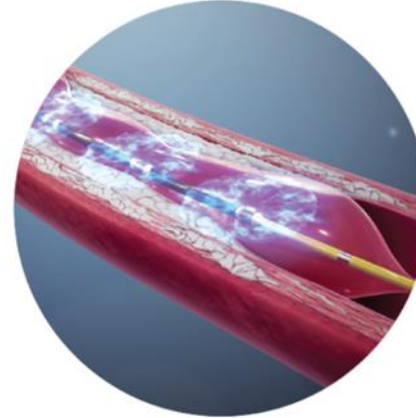
1

Se avanza el balón de litotricia sobre una guía de angioplastia.



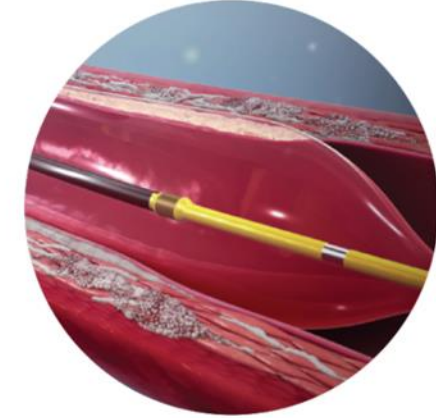
2

Se produce una descarga eléctrica que vaporiza los fluidos en contacto. Se crean burbujas que generan ondas de presión sónica



3

Se crea un campo que atraviesa el tejido blando, pero fractura el calcio en la pared.



4

Tras la modificación se eleva a su presión nominal para expandir y aumentar el diámetro luminal

- 1.- Curva de aprendizaje baja
- 2.- Afecta calcio superficial y profundo
- 3.- Distribución simétrica
- 4.- Intrastent

- 1.- Vasos pequeños
- 2.- Calcificaciones largas (>50mm)
- 3.- Lesión no cruzables por balón, MC
- 4.- Calcificación nodular

Litotricia

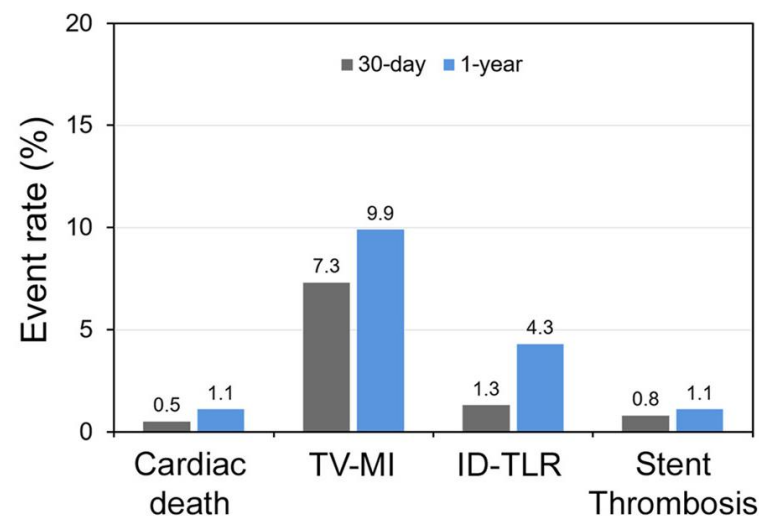
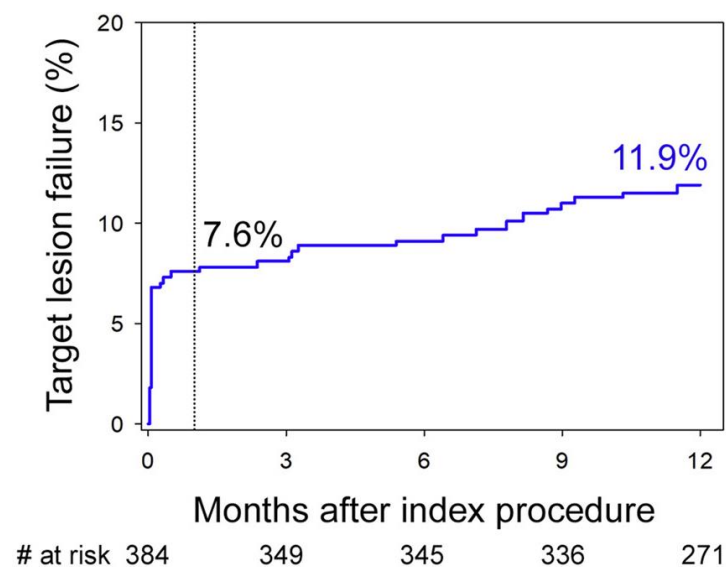
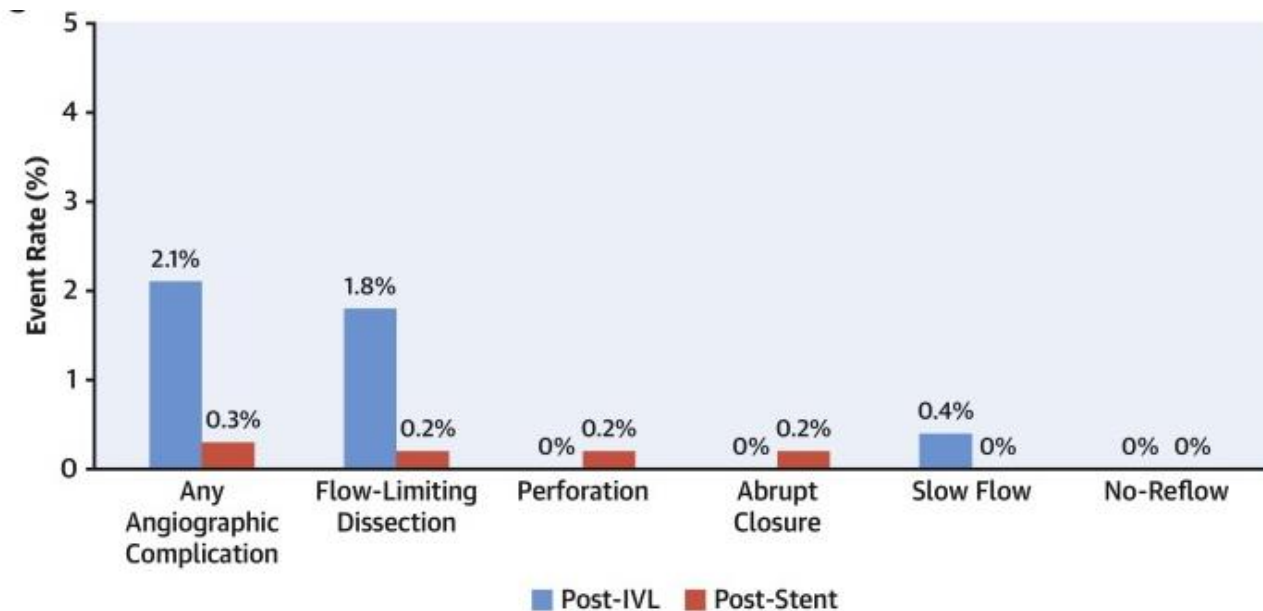
Análisis conjunto
DISRUPT-CAD trial
I,II,III y IV

N= 626

Seguimiento a 30d

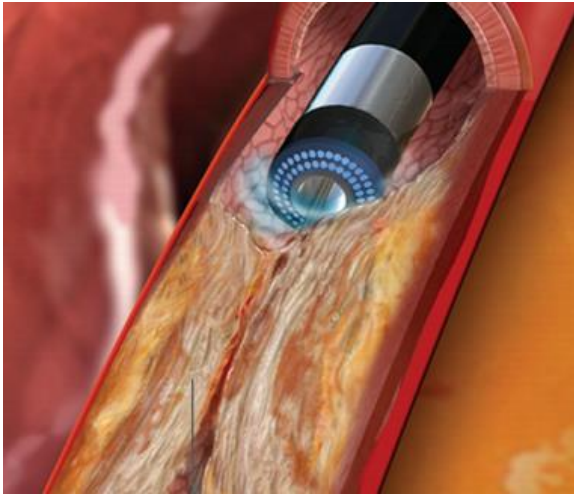
Objetivo TVF

Éxito 92%



ELCA: Excimer laser coronary atherectomy

Pulsos de luz ultravioleta 308 nm



A. Mechanisms of Action

1. Photochemical
Breaking Molecular Bonds

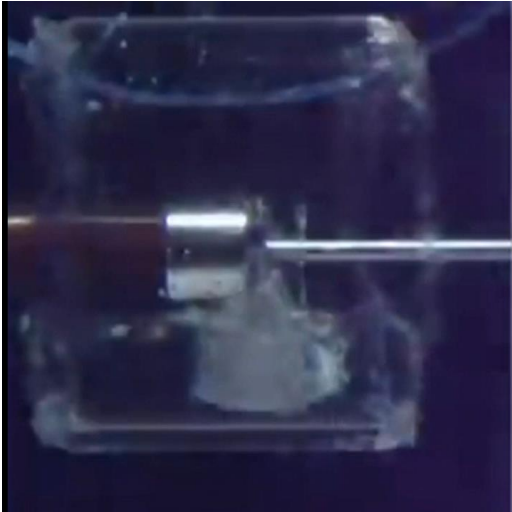
2. Photothermal
Localized Thermal Energy

3. Photomechanical
Microbubble formation

- B. Indications**
- In-stent Restenosis
 - Under-expanded Stent
 - Chronic Total Occlusions
 - Balloon Uncrossable Lesion
 - Calcification
 - Saphenous Vein Graft Intervention
 - Acute Coronary Syndrome

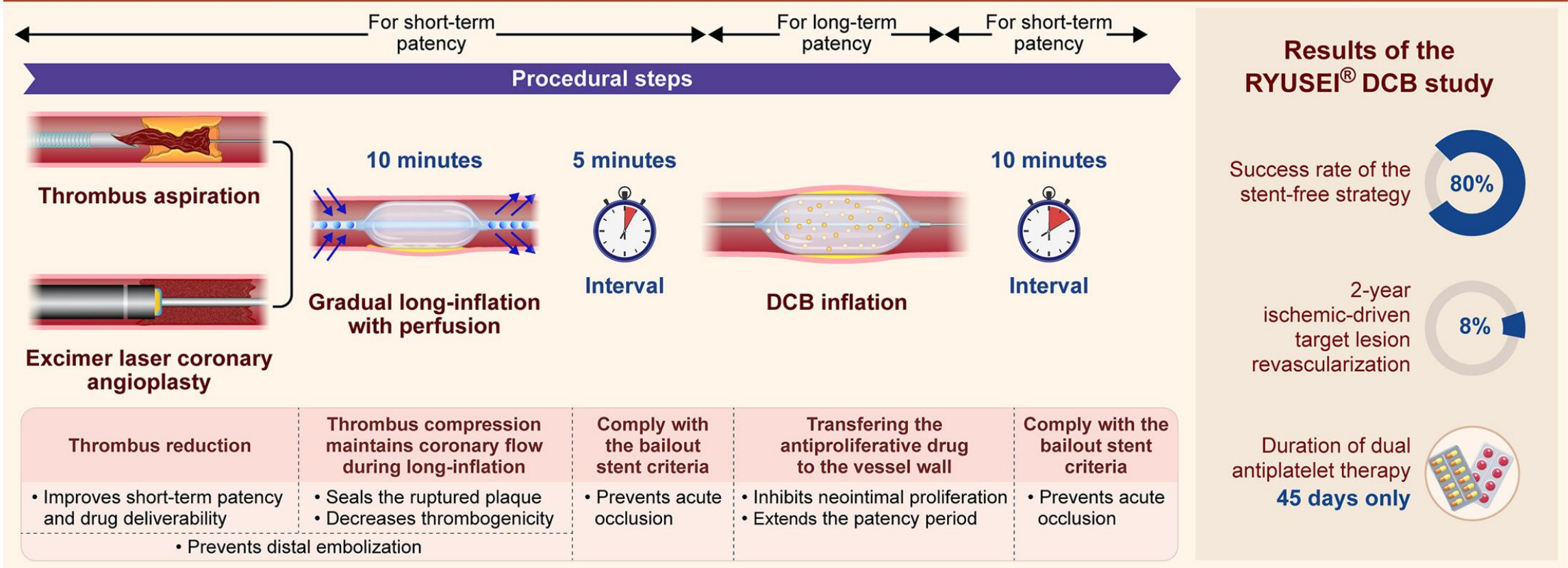
C. Techniques

Technique	<i>Destructive Force</i>
Saline	+
Blood	++
Contrast	+++
ELCA setting	
High Fluency	+++
High Pulse	+++

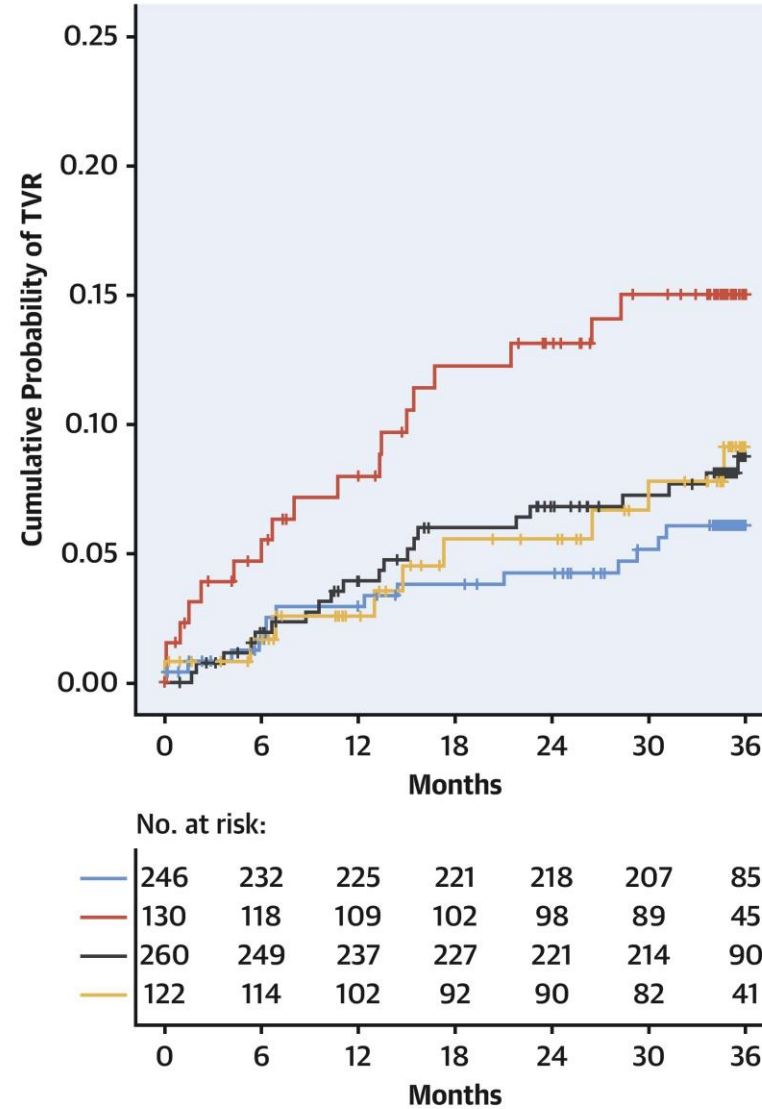
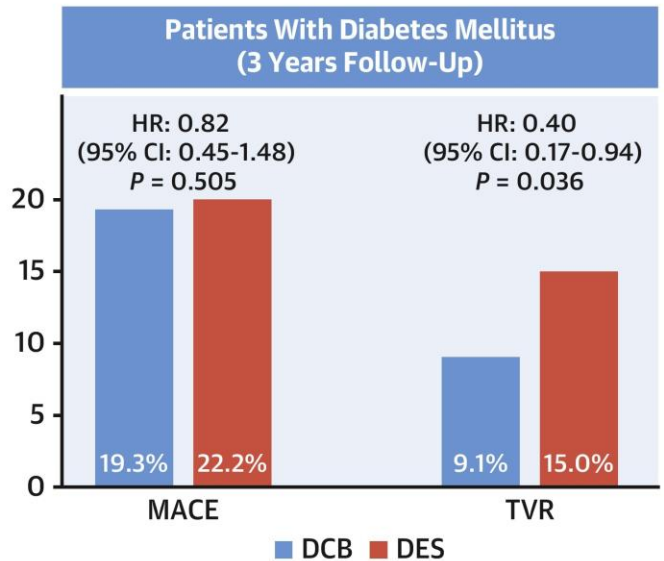
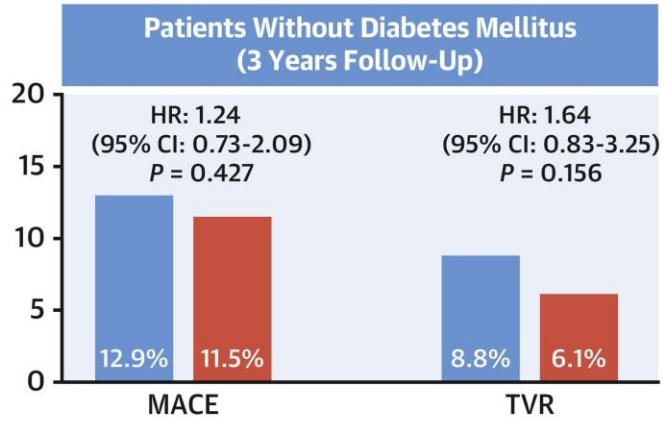


Futuras direcciones: No siempre hay que implantar un stent

Stentless Strategy with Perfusion and Drug-coated Balloons (DCBs) in Acute Coronary Syndrome

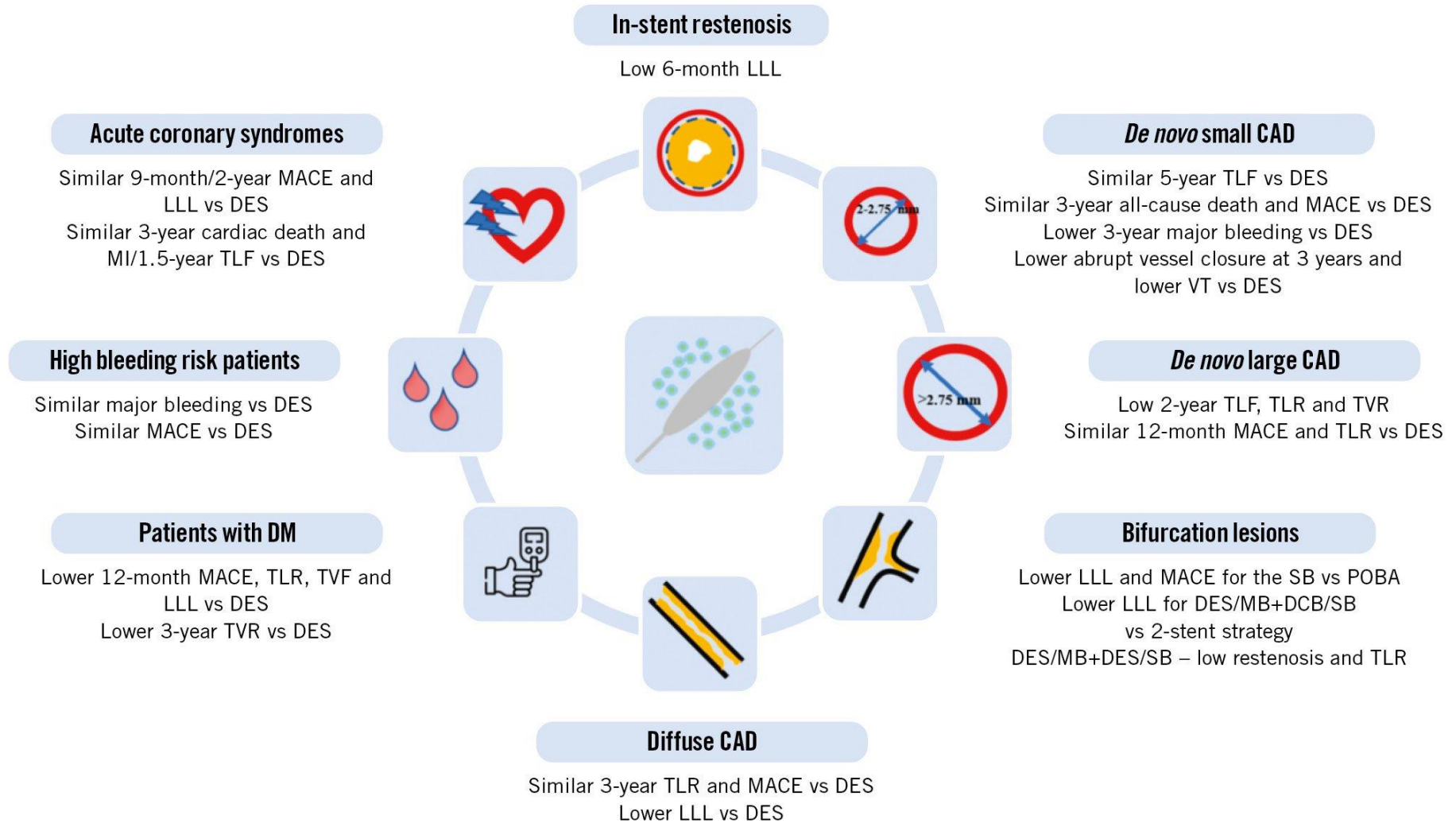


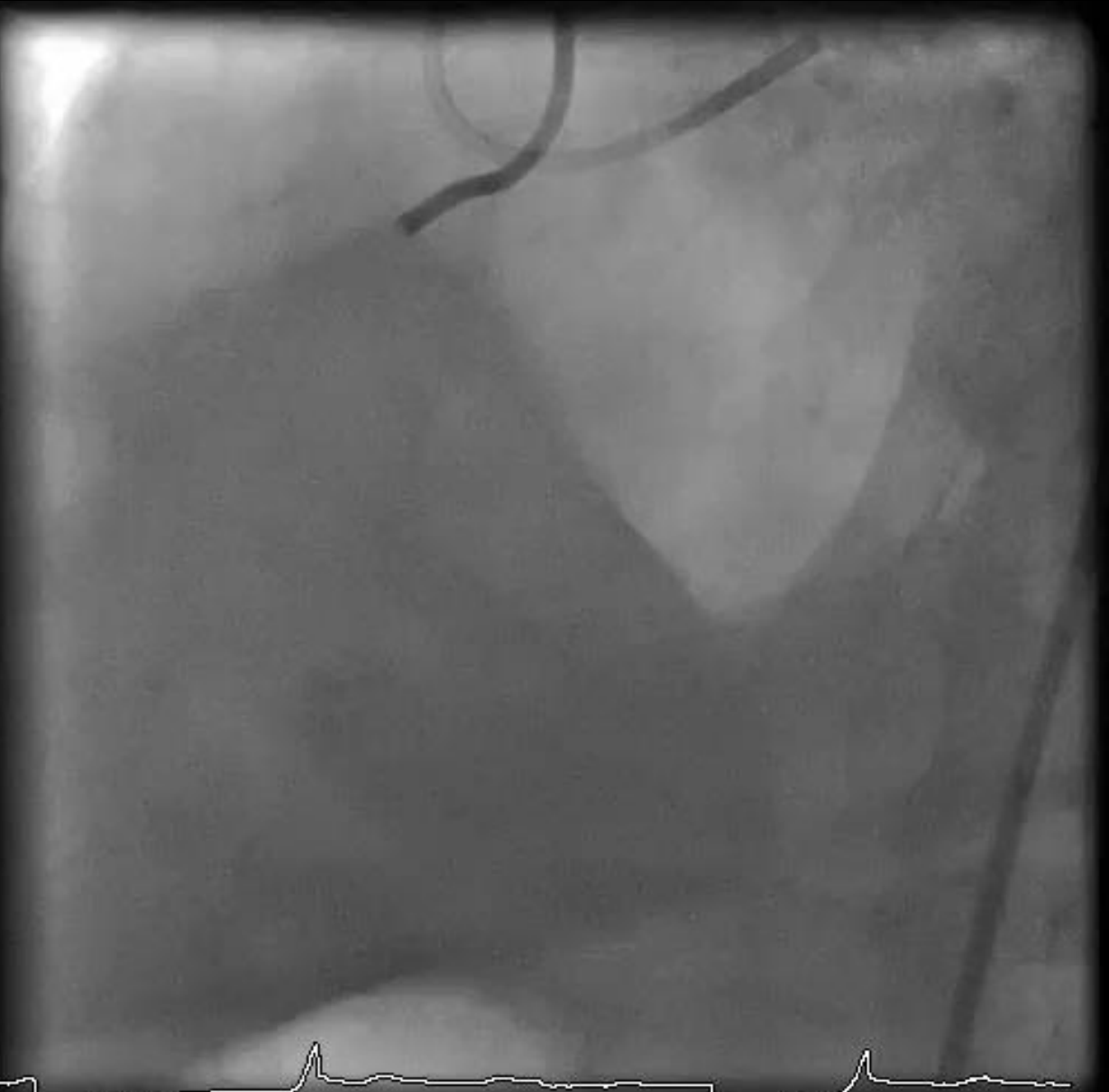
CENTRAL ILLUSTRATION: BASKET SMALL 2 TRIAL - Event Rates With DCB and DES in De Novo Coronary Lesions of Diabetic and Nondiabetic Patients

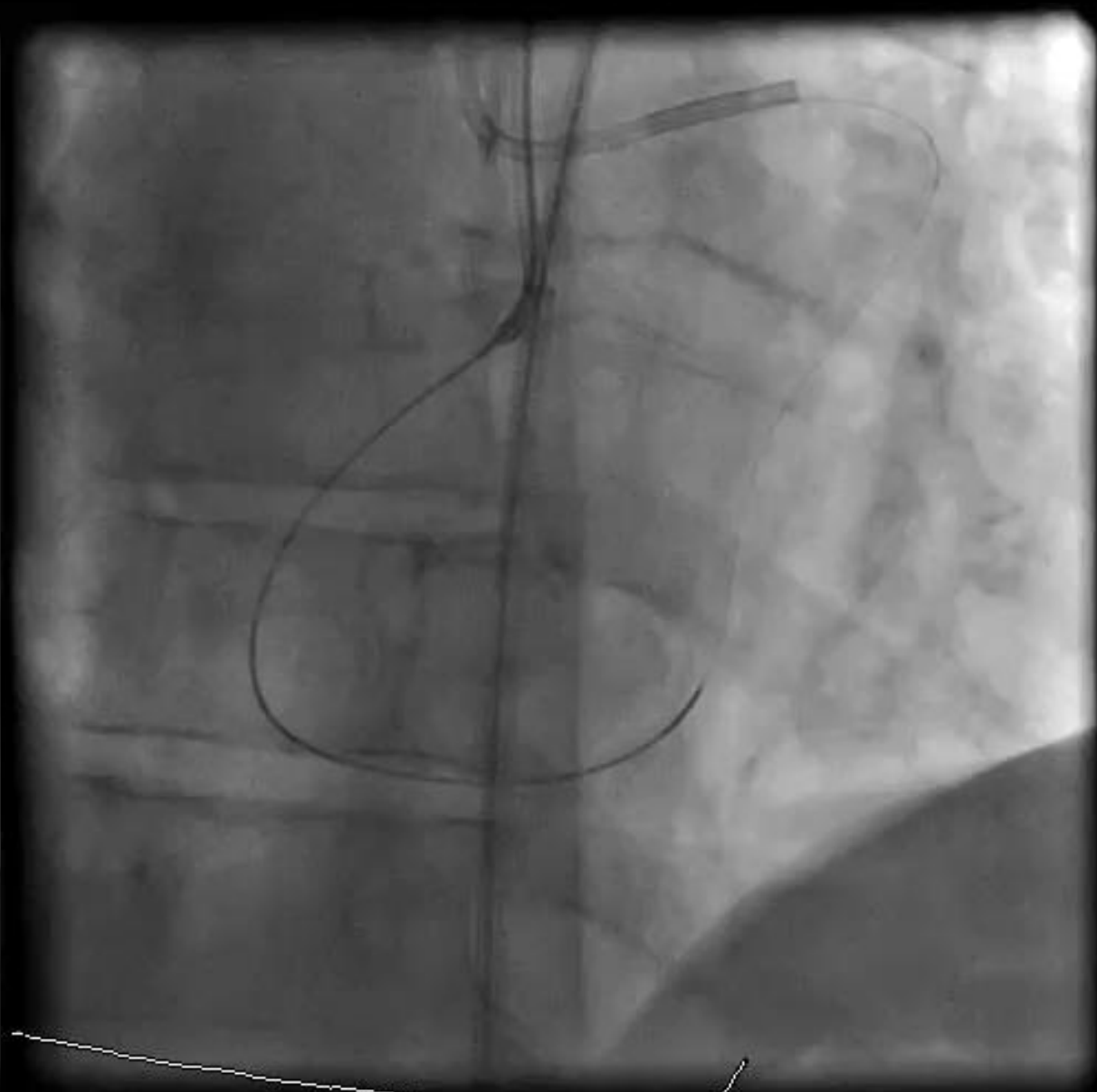
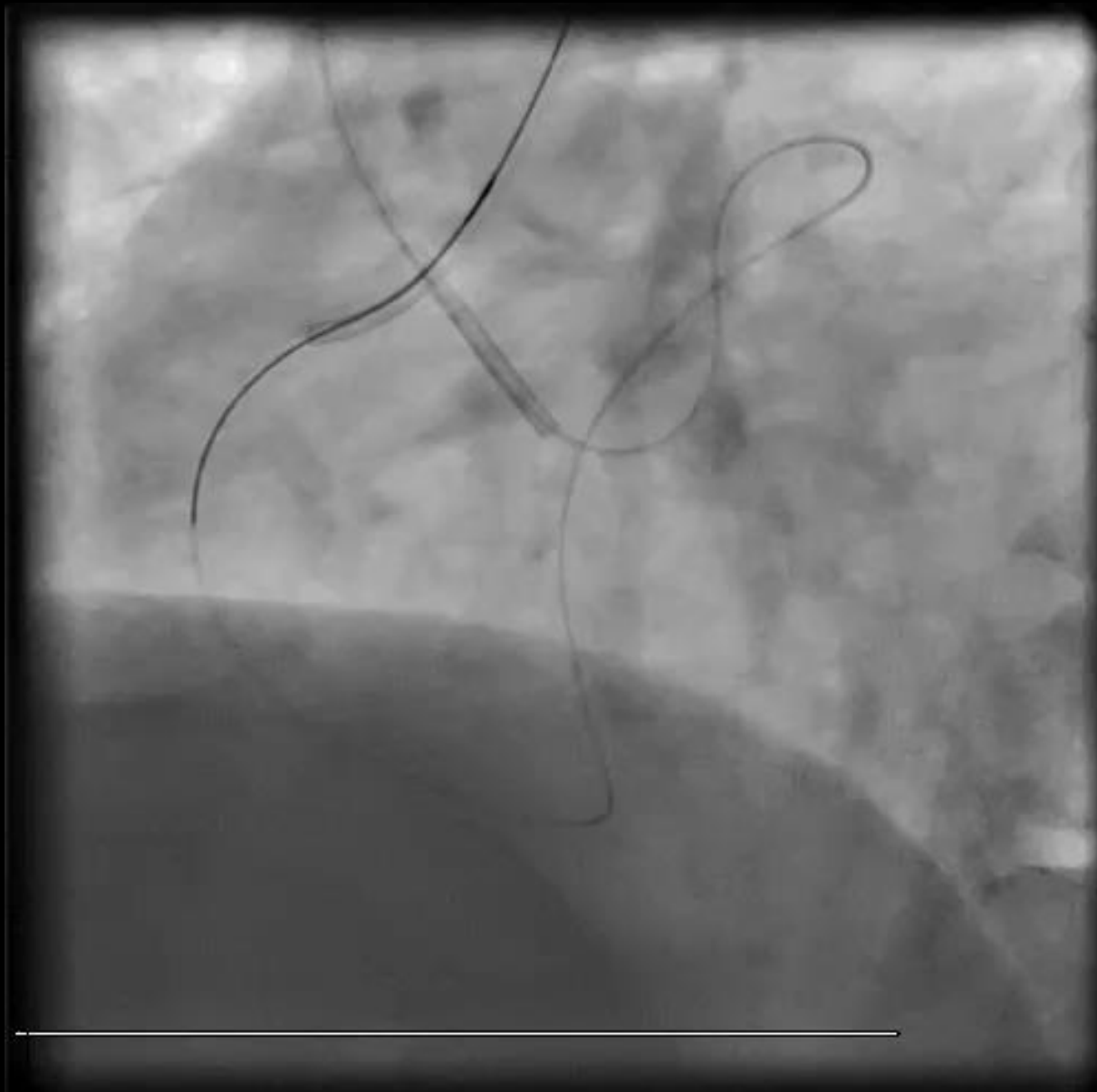


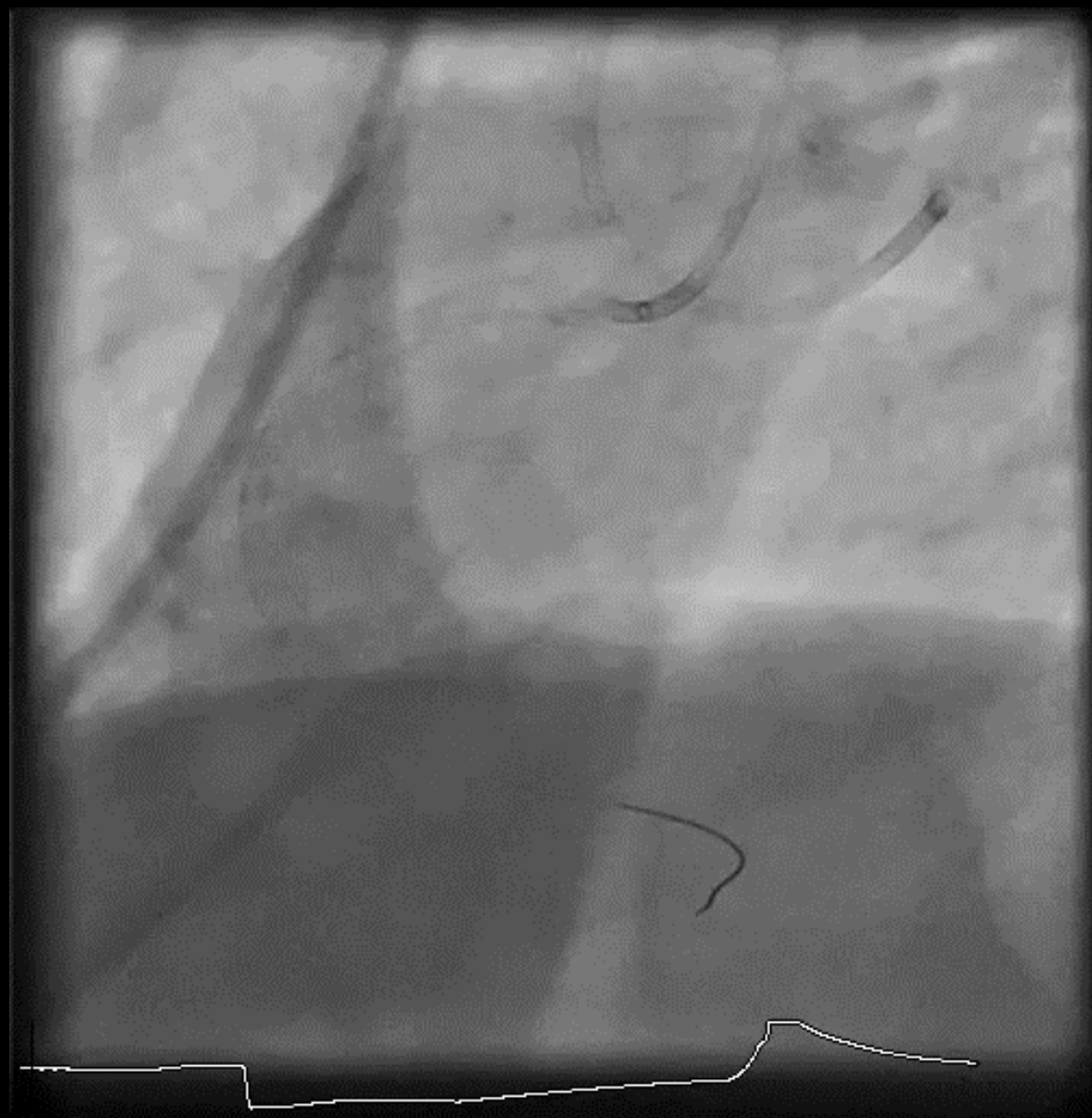
—+ Nondiabetic & DES —+ Diabetic & DES
—+ Nondiabetic & DCB —+ Diabetic & DCB

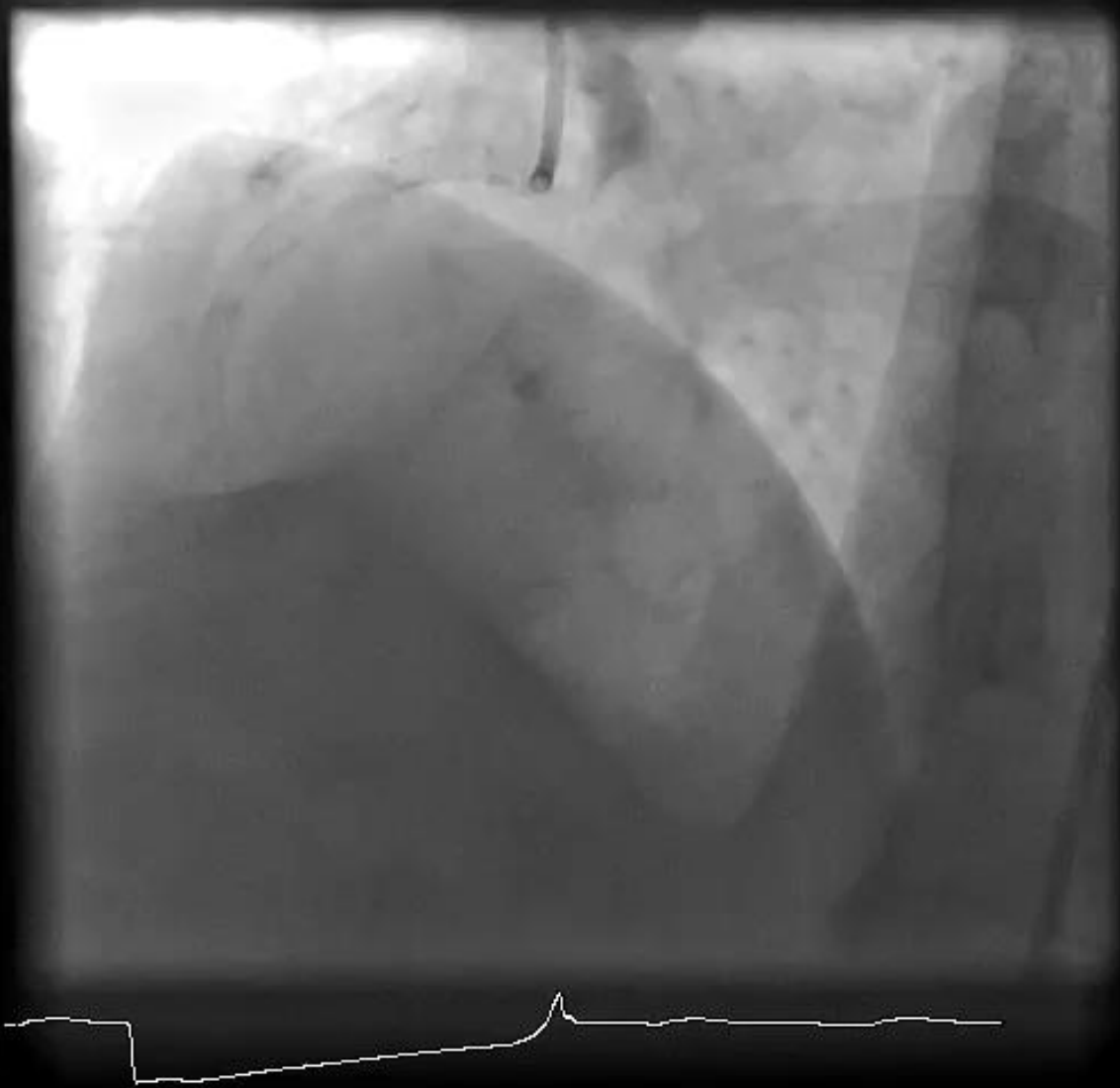
Recent DCB advances in coronary interventions











Take home messages

- La imagen intravascular es clave para elegir el tratamiento
- Arsenal terapéutico actual muy amplio para enfrentarnos a cualquier escenario
- Implante de stent no es la única estrategia actual para manejar la EC

Congreso de la **SAC24**
Sociedad Asturiana
de **Cardiología** 17 y 18 de mayo



Gracias

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#AsturCardio2024