

MODULE 1: ProEducar Fellows Course @CRF-TCT: Intravascular Imaging and CHIP interventions

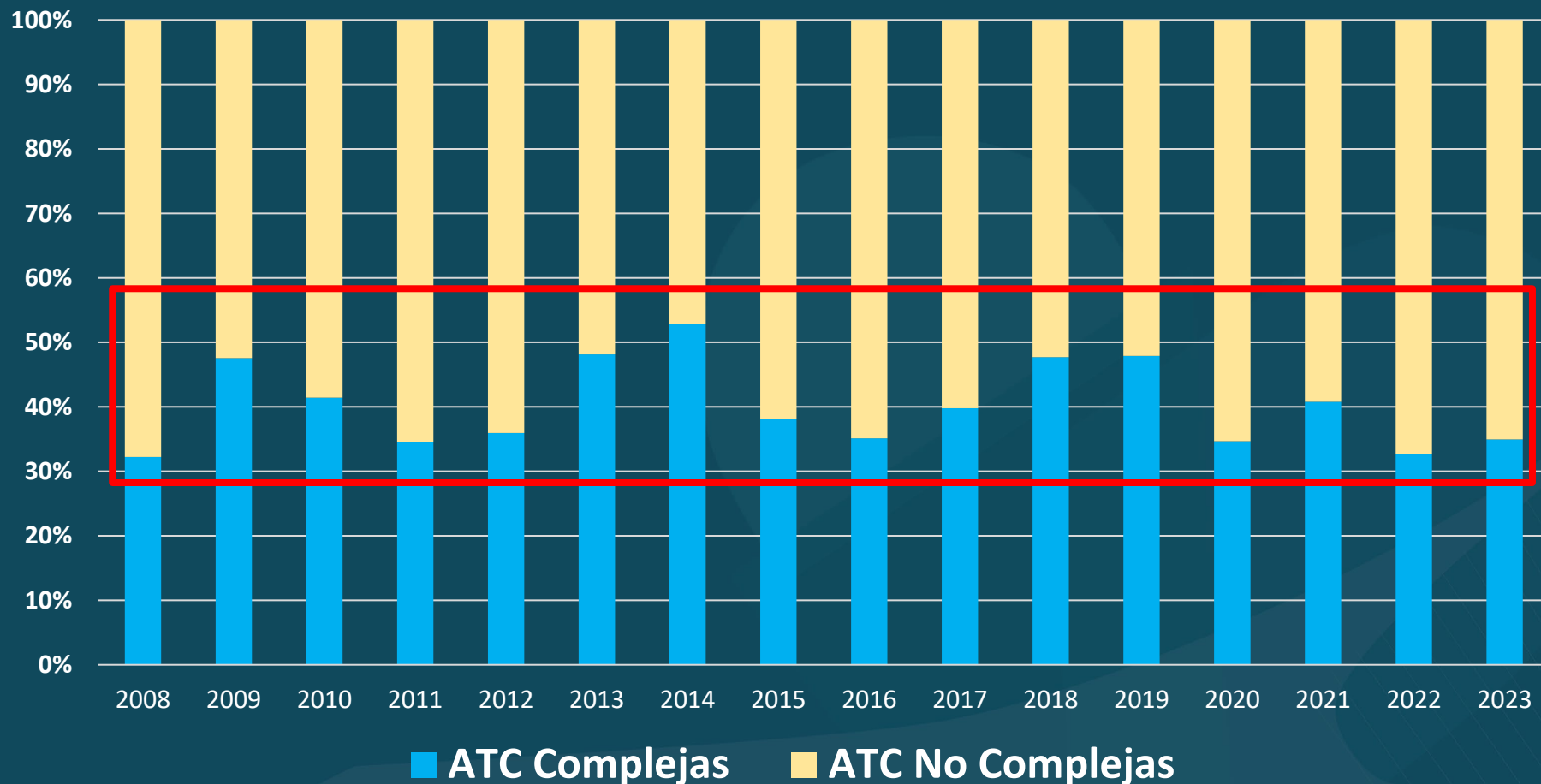
Learning case: Strategies in calcified lesions. Plaque modification.

Dr. Costantini, Ricardo

Jefe de Hemodinamia y Terapéutica por Cateterismo

Hospital Universitario Austral

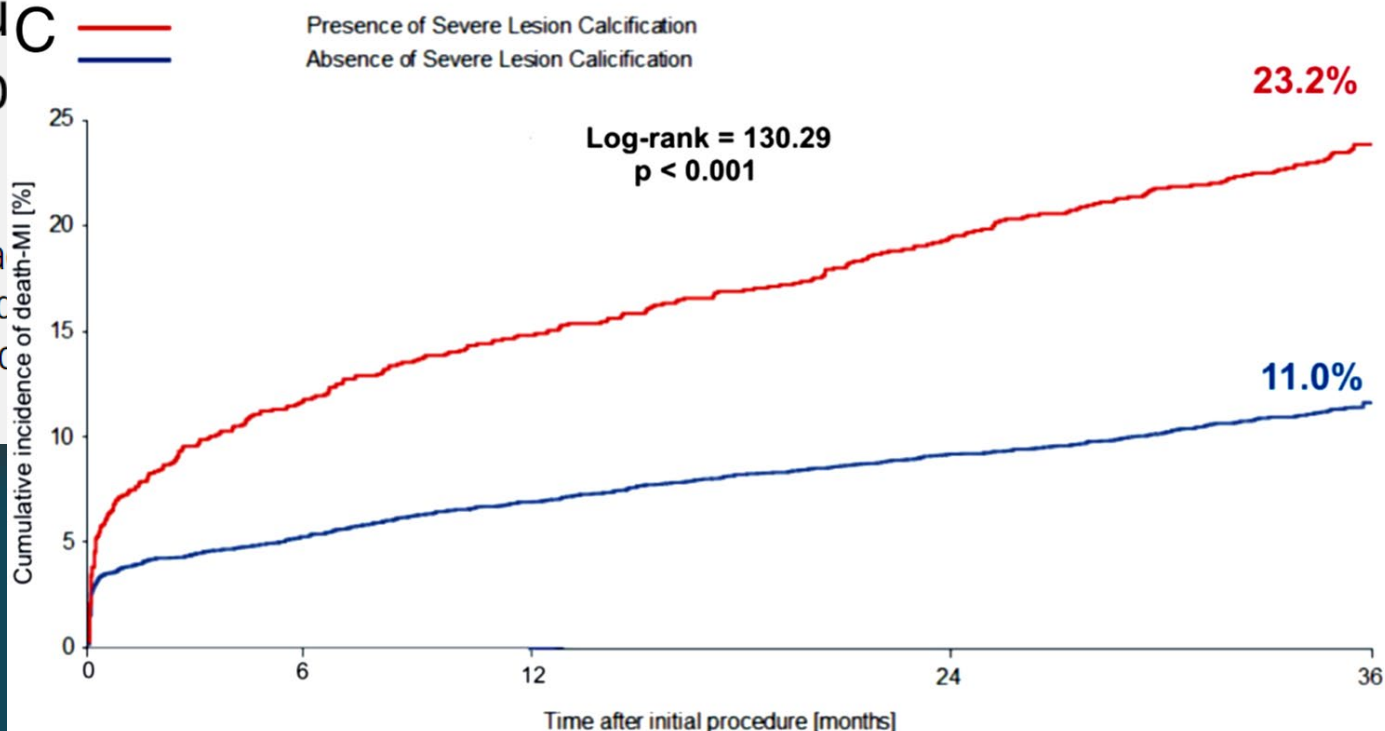
Angioplastia Coronaria (n= 5475) Complejas vs No Complejas



ORIGINAL ARTICLE

Prognostic implications of coronary calcification in patients with obstructive coronary artery disease treated by percutaneous coronary intervention: a patient-level pooled analysis of randomised controlled trials

Christos V Bourantas,¹ Yassir Alkhatib,¹ Stephan Windecker,³ Friedhelm Jochheim,¹ Yoshinobu Onuma,¹ Hector Garcia-Castano,¹ Patrick W Serruys^{1,7}



Bourantas CV, et al. *Heart* 2014;100:1158–1164. doi:10.1136/heartjnl-2013-305180

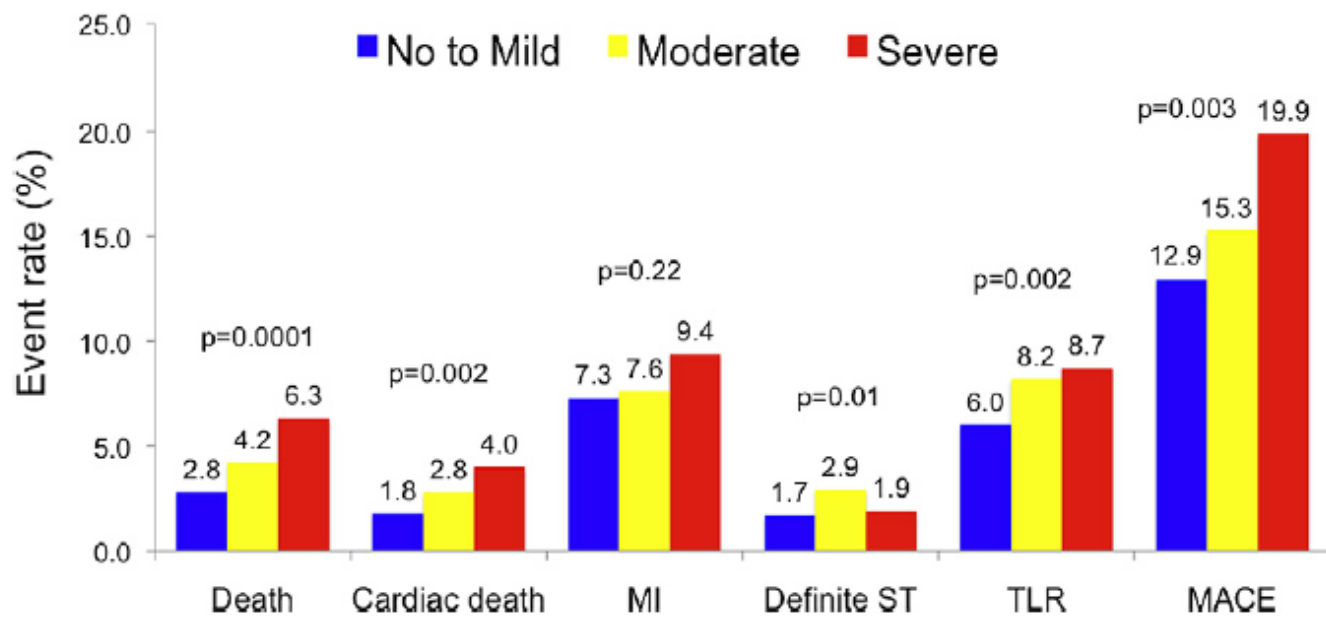
Ischemic Outcomes After Coronary Intervention of Calcified Vessels in Acute Coronary Syndromes



Pooled Analysis From the HORIZONS-AMI
(Harmonizing Outcomes With Revascularization and
Stents in Acute Myocardial Infarction)
(Acute Catheterization and Intervention Study)

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Tullio Palmerini, MD,§ Laura L. McNeill,
Ajay Kirtane, MD, SM,*† Alexar
Gregg W. Stone, MD*†

New York, New York; Montr  al, Qu  bec



J Am Coll Cardiol 2014;63:1845–54

SM J.C.
HC: 148846

78 años

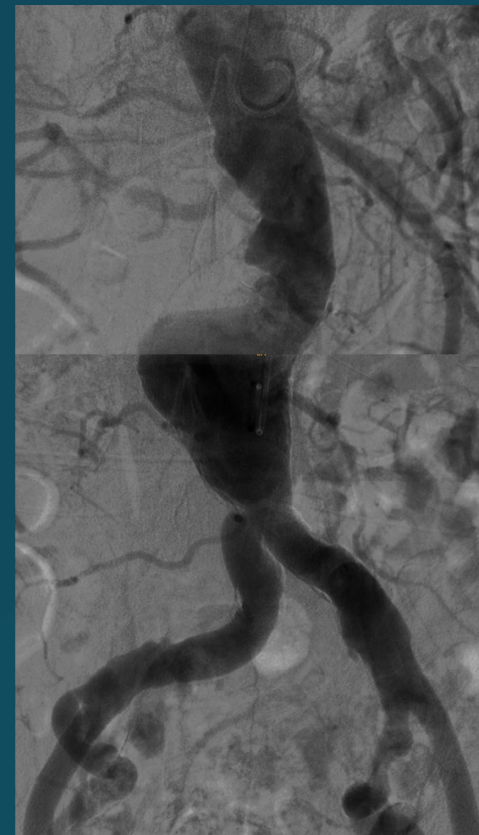
HTA, TAB, DLP, Hiperuricemia

2011 ATC DA

Dx de Carcinoma urotelial de alto grado de vejiga realizó tratamiento resección transuretral (RTU) en 3 oportunidades + cistectomía parcial laparoscópica + QMT c/ cisplatino 5 ciclos.

Motivo de ingreso:

Luego de 48hs pos infusión de cisplatino presenta disnea rápidamente progresiva – ICC + EAP – cambios en ECG: t negativas cara anterior y Troponinas + 24 – 60 pg/ml.



Ecocardiograma: VI no dilatado, espesores parietales aumentados. **FEY 58%, sin asinergias.** Dilat mod AI (área 31cm²) - Flujo transvalvular mitral con patrón de relajación alterado. Válvula mitral con anillo calcificado y leve insuficiencia. **Fibroesclerosis valvular aórtica marcada con severa restricción de apertura.** Flujo transvalvular aórtico con gradiente medio de 46mmhg. VD conservado. TAPSE 22mm





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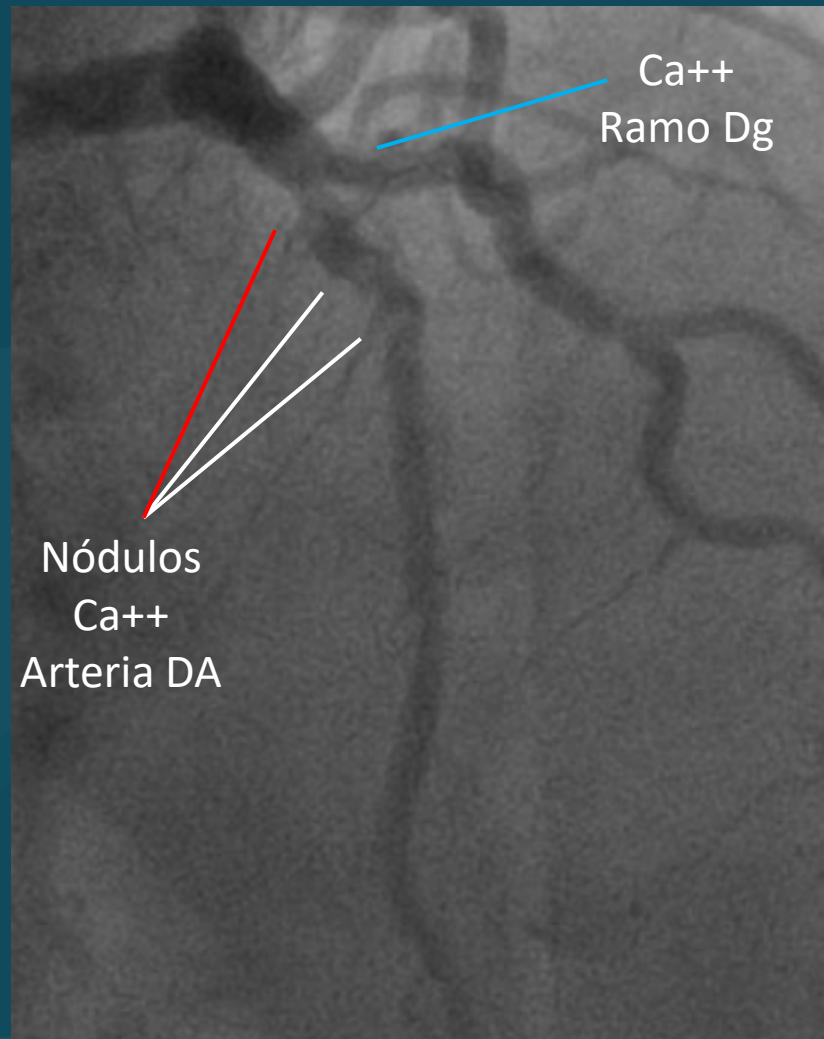


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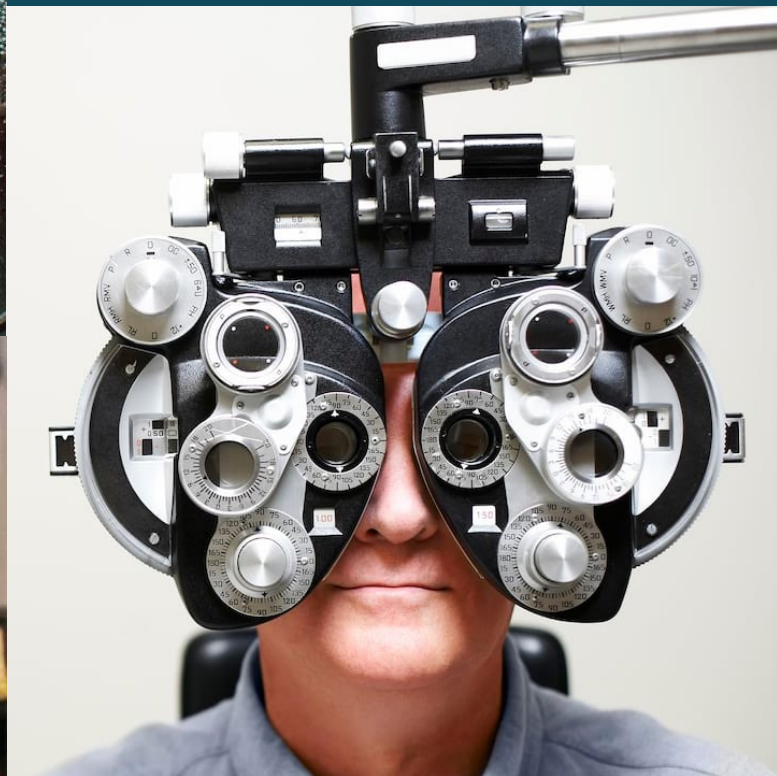
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Optimizar los resultados de la ATC: importancia capital

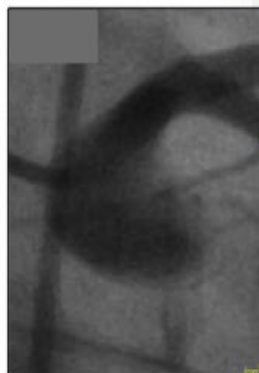




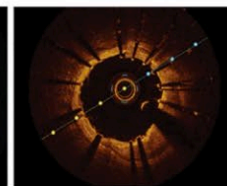
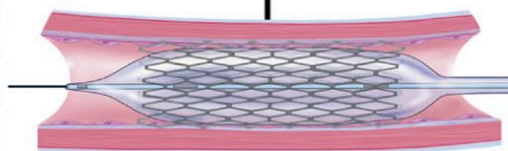
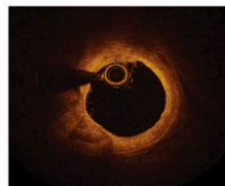
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Intracoronary Imaging



Preintervention Assessment

Assess plaque composition, lesion characteristics, and mechanisms of stent failure

Identify reference segments and landing zones

Choose stent size (length and diameter) and lesion preparation strategy

Lesion Preparation and Stent Deployment

Confirm landing zones

Prepare lesion (eg, angioplasty, atherectomy, lithotripsy)

Determine success of preparation strategy and optimize stent expansion

Assessment of Postprocedure Endpoints and Complications

Identify stent underexpansion, deformation, and malapposition

Identify edge dissection, hematoma, and tissue protrusion

Rule out geographic miss and inflow/outflow disease

The OPUS-CLASS Study - J Am Coll Cardiol Img 2013;6:1095–104



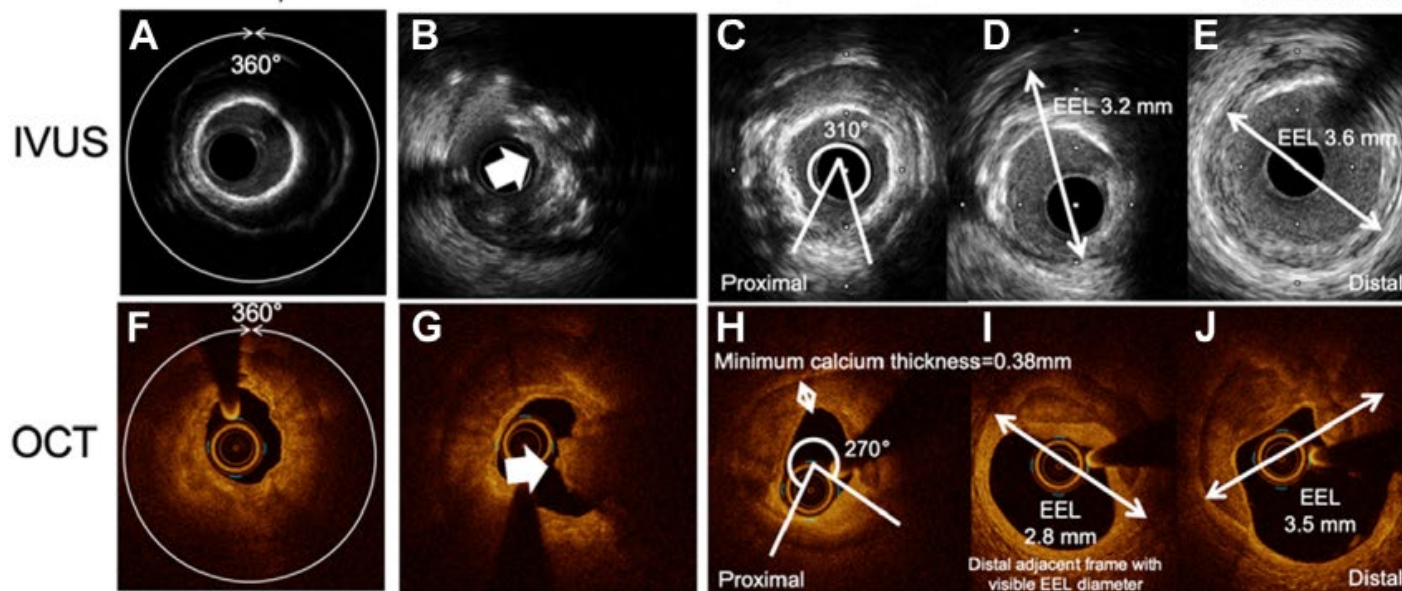
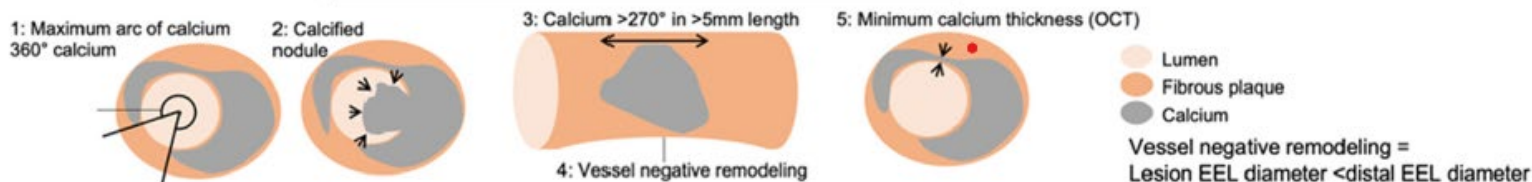
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Angiographic Criteria

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



Robert F. Riley et al - SCAI Expert Consensus Statement on the Management of Calcified Coronary Lesions
 Journal of the Society for Cardiovascular Angiography & Interventions 3 (2023) 101259

A new optical coherence tomography-based calcium scoring system to predict stent underexpansion

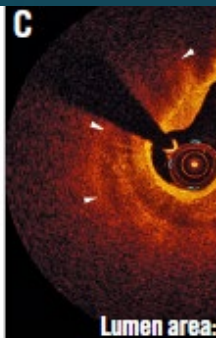
Variables	Calcium score					p-value
	0 (n=27)	1 (n=45)	2 (n=34)	3 (n=3)	4 (n=24)	
Pre-intervention (Angiographic findings)						
Any calcification	37.0% (10)	40.0% (18)	67.6% (23)	33.3% (1)	87.5% (21)	<0.01
Moderate calcification	33.3% (9)	37.8% (17)	44.1% (15)	0% (0)	33.3% (8)	<0.01
Severe calcification	3.7% (1)	2.2% (1)	23.5% (8)	33.3% (1)	54.2% (13)	<0.01
Pre-intervention (OCT findings)						
Maximum calcium angle, °	62 (41, 77)	79 (56, 121)	129 (114, 162)	198 (187, 237)	279 (233, 308)	<0.01
Maximum calcium thickness, mm	0.38 (0.26, 0.46)	0.77 (0.61, 0.91)	1.0 (0.82, 1.22)	0.59 (0.58, 0.65)	0.97 (0.76, 1.1)	<0.01
Calcium length, mm	2.4 (2.0, 3.6)	3.8 (3.1, 4.7)	8.7 (6.4, 13.5)	4.4 (3.0, 4.7)	17.4 (9.9, 28.5)	<0.01
Minimum lumen area, mm ²	1.7 (0.8, 2.4)	1.3 (0.9, 1.6)	1.2 (0.90, 1.7)	1.1 (0.7, 5.4)	1.1 (0.96, 1.7)	0.75
Procedural results						
Total stent length, mm	20 (18, 33)	26 (20, 33)	34 (22, 43)	22 (18, 23)	35 (22, 40)	0.15
Total number of stents used	1 (1, 1)	1 (1, 1)	1 (1, 2)	1 (1, 1)	1 (1, 2)	0.47
Maximum device diameter, mm	3.5 (3.0, 4.0)	3.5 (3.0, 3.5)	3.5 (3.0, 3.5)	3.5 (3.25, 3.5)	3.5 (3.0, 3.5)	0.30
Maximum inflation pressure, atm	14 (14, 18)	15 (14, 18)	18 (14, 20)	14 (14, 18)	18 (15, 20)	0.09
Balloon to artery ratio	1.09 (0.97, 1.16)	1.02 (0.97, 1.16)	1.05 (0.98, 1.17)	1.06 (0.97, 1.17)	1.06 (0.96, 1.12)	0.75
Post-intervention (OCT findings)						
MSA, mm ²	7.2 (5.4, 9.2)	6.3 (5.2, 8.4)	5.9 (4.8, 8.0)	6.7 (5.8, 7.1)	5.7 (4.4, 7.4)	0.21
Stent expansion at target lesion calcium, %	99 (93, 108)	98 (86, 109)	86 (77, 100)	98 (83, 104)	78 (70, 86)	<0.01
Stent expansion at MSA, %	91 (84, 95)	85 (78, 93)	80 (73, 93)	80 (73, 85)	69 (60, 77)	<0.01
Edge dissection >60°	25.9% (7)	26.7% (12)	17.7% (6)	33.3% (1)	12.5% (3)	0.61
Malapposition	40.7% (11)	42.2% (19)	64.7% (22)	0.0% (0)	54.1% (13)	0.07
Tissue protrusion	55.6% (15)	55.6% (25)	47.1% (16)	100% (3)	45.8% (11)	0.48
Values are median (first quartile, third quartile) or % (n). MSA: minimum stent area; OCT: optical coherence tomography						

0 point
2 points

0 point
1 point

0 point
1 point

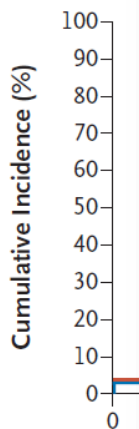
points



Akiko Fujino, Gary S. Mintz et al - EuroIntervention 2018;13:e2182-e2189

RENOVATE-CO

A Target-Vessel Failure



No. at Risk

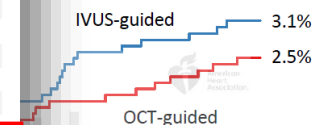
Angiography-guided PCI 547
Imaging-guided PCI 1092

Subgroup	Intravascular Imaging- Guided PCI no. of events/total no. of patients (cumulative incidence, %)	Angiography- Guided PCI no. of events/total no. of patients (cumulative incidence, %)	Hazard Ratio (95% CI)
Overall	76/1092 (7.7)	60/547 (12.3)	0.64 (0.45–0.89)
Type of imaging devices			
Intravascular ultrasonography	59/800 (8.0)	60/547 (12.3)	0.66 (0.46–0.95)
Optical coherence tomography	15/278 (5.8)	60/547 (12.3)	0.47 (0.27–0.83)
Type of complex coronary lesions			
True bifurcation	23/233 (10.3)	13/126 (11.8)	0.97 (0.49–1.93)
Chronic total occlusion	9/220 (5.0)	13/99 (14)	0.30 (0.13–0.71)
Unprotected left main coronary artery disease	9/138 (6.8)	11/54 (25)	0.31 (0.13–0.76)
Diffuse long coronary-artery lesion	36/617 (6.5)	31/281 (11.9)	0.52 (0.32–0.83)
Multivessel PCI involving ≥2 major coronary arteries	36/409 (9.5)	22/213 (11.7)	0.84 (0.50–1.44)
Lesion necessitating use of ≥3 stents	16/208 (8.1)	6/97 (6)	1.24 (0.49–3.18)
Severely calcified lesion	11/157 (7.3)	11/74 (17)	0.46 (0.20–1.06)
Ostial lesions of major coronary artery	8/182 (4.4)	9/69 (16)	0.33 (0.13–0.85)
Initial presentation			
Stable ischemic heart disease	25/532 (5.0)	27/275 (10.4)	0.46 (0.27–0.80)
Acute coronary syndrome	51/560 (10.4)	33/272 (14.6)	0.74 (0.48–1.15)
Age			
<65 yr	36/517 (7.8)	23/238 (10.6)	0.72 (0.42–1.21)
≥65 yr	40/575 (7.4)	37/309 (13.6)	0.57 (0.36–0.88)
Sex			
Male	66/869 (8.3)	46/431 (11.7)	0.70 (0.48–1.02)
Female	10/223 (5.2)	14/116 (14.5)	0.35 (0.16–0.80)
Diabetes mellitus			
Yes	45/394 (12.9)	26/223 (12.3)	0.97 (0.60–1.57)
No	31/698 (4.7)	34/324 (12.2)	0.41 (0.25–0.67)
Chronic kidney disease			
Yes	22/203 (13.3)	19/93 (23)	0.51 (0.27–0.93)
No	54/889 (6.4)	41/454 (9.9)	0.66 (0.44–0.99)
Left ventricular ejection fraction			
<50%	22/210 (12.0)	12/84 (15)	0.72 (0.35–1.45)
≥50%	54/882 (6.7)	48/463 (11.8)	0.58 (0.39–0.85)

Intravascular Imaging-
Guided PCI Better Angiography-Guided
PCI Better

ed Clinical Trial

95% CI, 0.47–1.36)
<0.001



IVUS-guided 3.1%
OCT-guided 2.5%

6 9 12

9 12

andomization

4 979 912
1 969 893

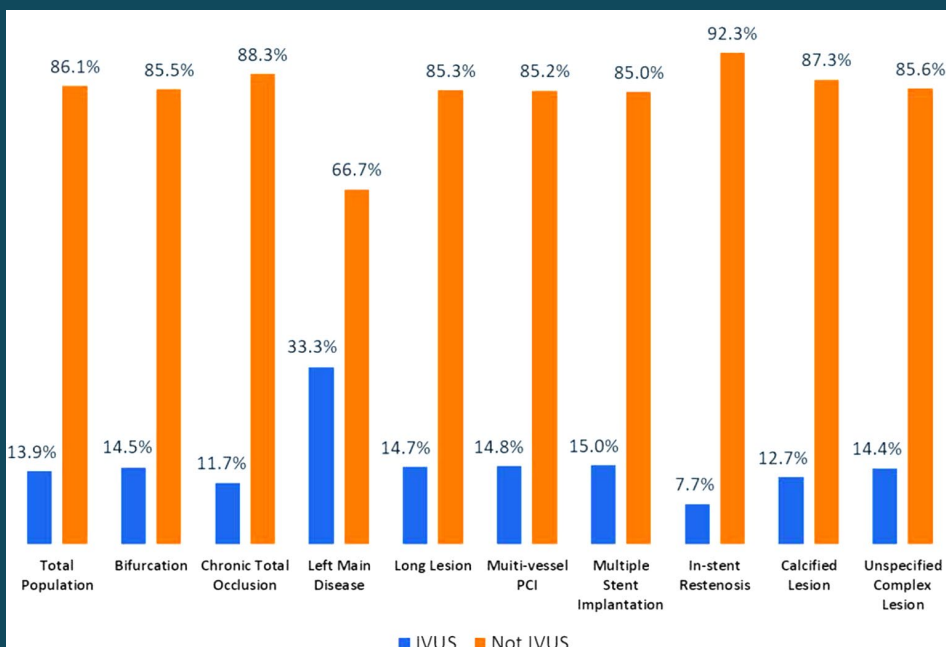
J.M. Lee, K.H. Choi, Y.B.
Intravascular Imaging-
Complex PCI: March 5,
10.1056/NEJMoa2216607

28, 2023.

guided or Intravascular
Coronary
gress, August 25 –

PCI With and Without IVUS for Complex Lesions: Utilization, Mortality, and Target Vessel Revascularization

66 hospitals in New York State were included.
198 866 patients underwent an index PCI - Patients with complex lesions comprised **22% of all PCI patients**.



Hannan et al - Circ Cardiovasc Interv. 2022;15:e011687. DOI: 10.1161/CIRCINTERVENTIONS.121.011687



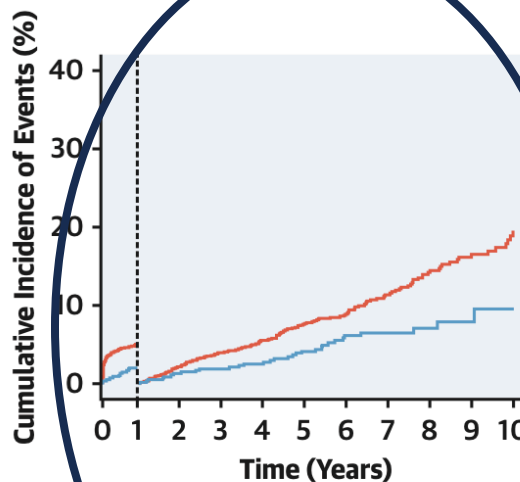
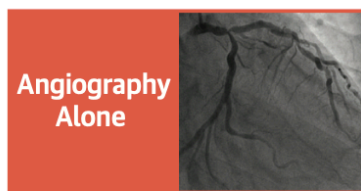
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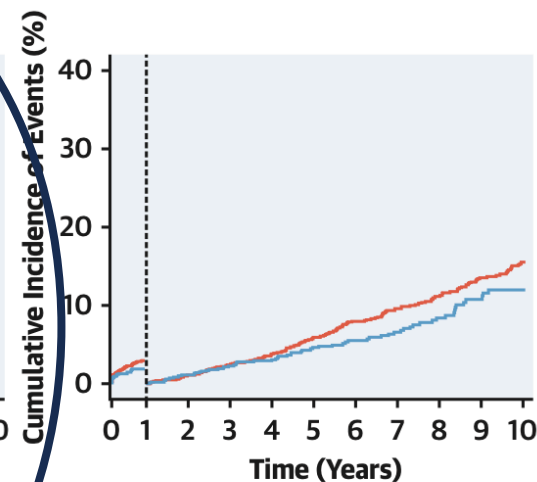
Patients Undergoing Complex PCI (Bifurcation, CTO, Unprotected LM, ISR, Long Stent Length, Multivessel PCI, ≥ 3 Stents, and Severely Calcified) N = 6,005

10-Year Risk of Cardiac Death or TVMI



Less Experienced Operator
(Independent PCI Experience
 ≤ 5 Years)

51.8% Risk Reduction
 $P < 0.001$



Experienced Operator
(Independent PCI Experience
 > 5 Years)

26.6% Risk Reduction
 $P = 0.013$

Choi KH, et al. J Am Coll Cardiol Interv. 2023;16(14):1746-1758.

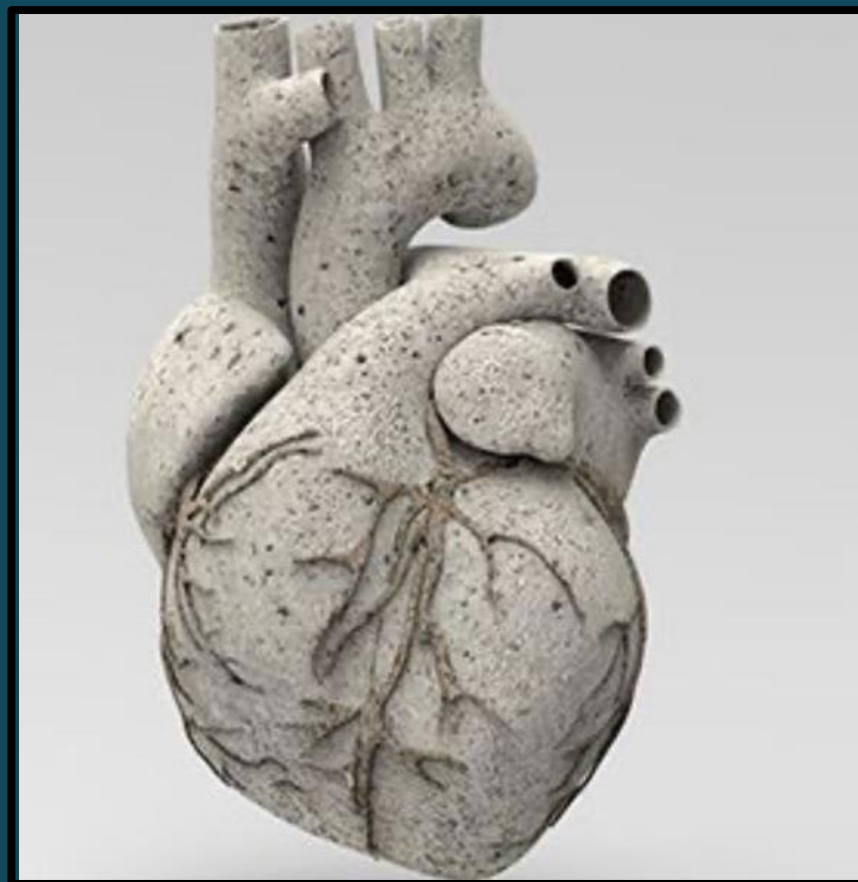


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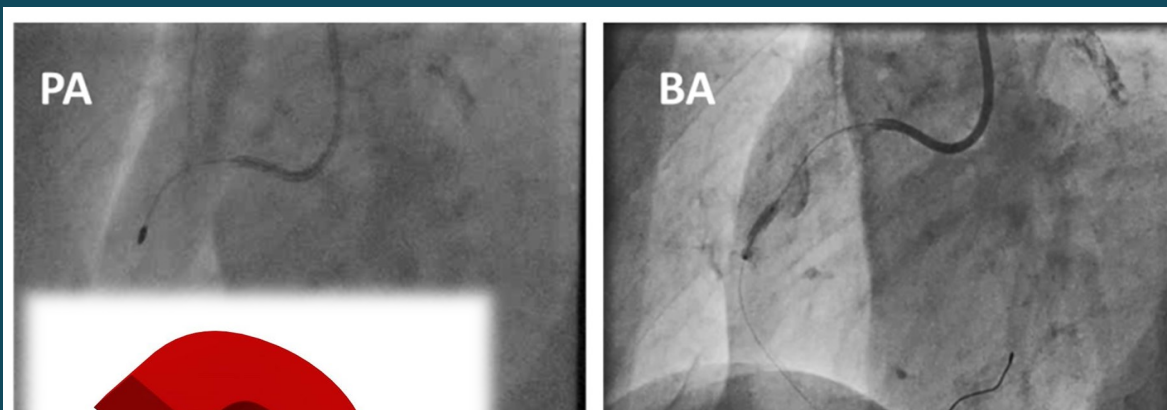
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Planned Versus Bailout Rotational Atherectomy: A Systematic Review and Meta-Analysis



Angiography success

Study or Subgroup

MACE

Allali 2016

Cao 2020

Kawamoto 2016

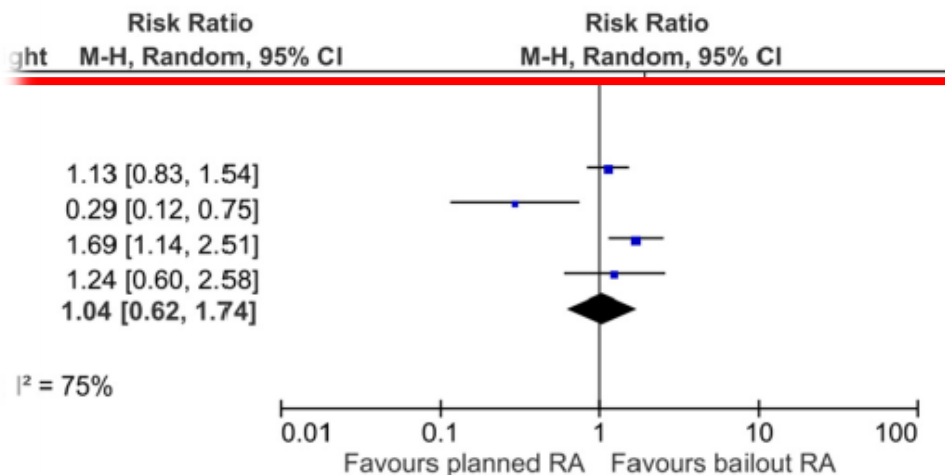
Qi 2020

Subtotal (95% CI)

Total events

Heterogeneity: $\tau^2 = 0.75$

Test for overall effect: $Z = 1.04$



K. Schwarz, S. Lovatt, J.A. Borovac et al. - Cardiovascular Revascularization Medicine 39 (2022) 45–51

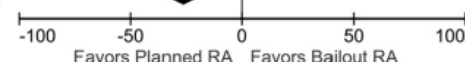
Planned Versus Bailout Rotational Atherectomy: A Systematic Review and Meta-Analysis

Dissection

Study or Subgroup	Events	Weight
Allali 2016		
Cao 2020		
Gao 2021		
Qi 2020		
Total (95% CI)		
Total events		
Heterogeneity: $\tau^2 = 0.23$		
Test for overall effect: $Z = 1.1$		

Procedure time

Procedure time		Planned RA			Bailout RA			Mean Difference		Mean Difference			
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI				
Allali 2016	76	35	308	111	50	204	27.9%	-35.00 [-42.90, -27.10]					
Cao 2020	83.5	26.2	138	100.8	36.4	52	24.0%	-17.30 [-28.12, -6.48]					
Kawamoto 2016	65.2	36.8	358	84.4	43.1	309	30.1%	-19.20 [-25.33, -13.07]					
Qi 2020	105.5	36.7	153	139.8	56.2	58	18.1%	-34.30 [-49.89, -18.71]					
Total (95% CI)			957			623	100.0%	-25.88 [-35.54, -16.22]					
Heterogeneity: Tau² = 71.00; Chi² = 12.88, df = 3 (P = 0.005); I² = 77%													
Test for overall effect: Z = 5.25 (P < 0.00001)													
									-100	-50	0	50	100
									Favors Planned RA Favors Bailout RA				

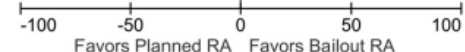


In-hospital MI

Study or Subgroup	Events	Weight
Allali 2016		
Cao 2020		
Kawamoto 2016		
Qi 2020		
Total (95% CI)		
Total events		
Heterogeneity: $\tau^2 = 0.00$		
Test for overall effect: $Z = 1.1$		

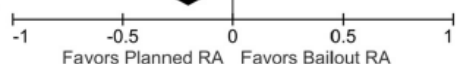
Contrast use

Contrast use		Planned RA			Bailout RA			Mean Difference		Mean Difference	
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI		
Allali 2016	202	92	308	279	135	204	19.9%	-77.00 [-98.18, -55.82]			
Cao 2020	237	62	138	275	90	52	18.4%	-38.00 [-64.56, -11.44]			
Gao 2021	189.2	70	228	207.5	82	312	21.8%	-18.30 [-31.16, -5.44]			
Kawamoto 2016	232.9	141.6	358	302.9	150.3	309	19.6%	-70.00 [-92.27, -47.73]			
Qi 2020	164.3	66.7	153	182.6	61.9	58	20.4%	-18.30 [-37.42, 0.82]			
Total (95% CI)			1185				935	100.0%	-43.71 [-69.17, -18.25]		
Heterogeneity: Tau ² = 732.64; Chi ² = 33.92, df = 4 (P < 0.00001); I ² = 88%											
Test for overall effect: Z = 3.37 (P = 0.0008)											
											



Number of stents

Number of stents			Planned RA			Bailout RA			Mean Difference		Mean Difference	
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI		IV, Random, 95% CI		
Allali 2016	1.76	0.84	308	1.97	1.14	204	25.0%	-0.21 [-0.39, -0.03]				
Cao 2020	2	0.8	138	2.2	0.8	52	12.8%	-0.20 [-0.46, 0.06]				
Kawamoto 2016	1.7	0.9	358	1.9	1	309	39.3%	-0.20 [-0.35, -0.05]				
Qi 2020	1.9	0.7	153	2.1	0.6	58	23.0%	-0.20 [-0.39, -0.01]				
Total (95% CI)			957	623			100.0%	-0.20 [-0.29, -0.11]				
Heterogeneity: Tau ² = 0.00; Chi ² = 0.01, df = 3 (P = 1.00); I ² = 0%												
Test for overall effect: Z = 4.36 (P < 0.0001)												
												



K. Schwarz, S. Lovatt, J.A. Borovac et al. - Cardiovascular Revascularization Medicine 39 (2022) 45–51

Comparison of Coronary Intravascular Lithotripsy and Rotational Atherectomy in the Modification of Severely Calcified Stenoses

Received: 4 February 2023 | Revised: 7 June 2023 | Accepted: 14 August 2023

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ORIGINAL ARTICLE - CLINICAL SCIENCE

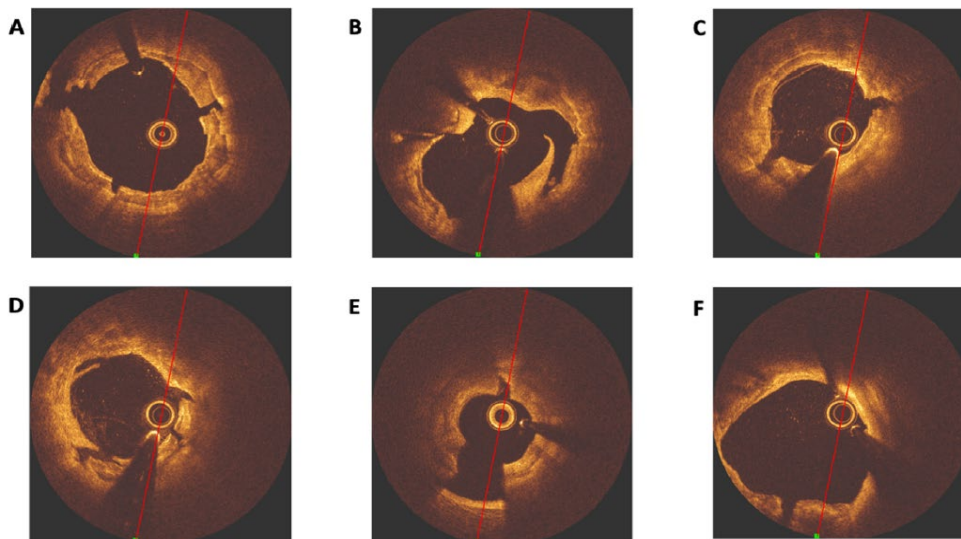
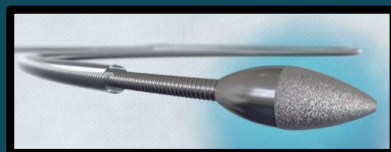
WILEY

Coronary intravascular lithotripsy and rotational atherectomy for severely calcified stenosis: Results from the ROTA.shock trial

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T. Gori MD³ | H. Ullrich MD³ | L. Gaede MD⁴ | S. Achenbach MD⁴ |
H. Möllmann MD⁵ | B. Chitic MD⁵ | A. Aksoy MD⁶ | G. Nickenig MD⁶ |
M. Weferling MD² | L. Rene Kühnemann⁷ | O. Dörr MD^{1,8} |
M. Bayer MD¹ | J. Hamm MD^{1,2,8} | the ROTA.shock Investigators



VS.



ROTA. Shock Investigators

Catheter Cardiovasc Interv. 2023;102:823–833.

Comparison of Coronary Intravascular Lithotripsy and Rotational Atherectomy in the Modification of Severely Calcified Stenoses

TABLE 3 Native OCT analysis.

	Overall (n = 32)	RA (n = 17)	IVL (n = 15)	p
Mean lumen diameter (mm)	2.72 ± 0.55	2.75 ± 0.60	2.70 ± 0.51	0.75
Mean lumen area (mm ²)	6.31 ± 2.47	6.43 ± 2.67	6.18 ± 2.31	0.77

TABLE 4 Primary endpoint analysis.

	Overall (n = 61)	RA (n = 33)	IVL (n = 28)	p
MSA (mm ²)	6.37 ± 2.36	6.60 ± 2.65	6.10 ± 1.99	0.41
Total length (mm)	16.72 ± 4.00	17.00 ± 2.81	16.40 ± 5.12	0.26
Indexed area per frame (mm ²)	0.38 ± 0.26	0.37 ± 0.24	0.39 ± 0.30	0.96
Mean thickness (mm)	0.61 ± 0.10	0.63 ± 0.12	0.62 ± 0.10	0.40
Calcified nodules present	16 (50%)	8 (47.1)	8 (53.3)	0.73

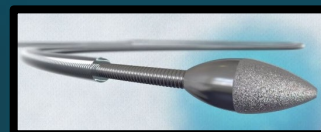
35 patients randomized to undergo IVL

33 patients successfully underwent IVL

Final OCT is available from 28 patients with IVL

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Catheter Cardiovasc Interv. 2023;102:823–833.

Comparison of Coronary Intravascular Lithotripsy and Rotational Atherectomy in the Modification of Severely Calcified Stenoses



Florian Blachutzik, MD ^{a,*} , Sophie	Mean lumen area stenosis (%)	58.8 ± 13.9	61.5 ± 14.5	0.42
Tommaso Gori, MD ^{c,g} , Helen Ullrich-D	Luminal gain (mm ²)	0.46 ± 0.16	0.17 ± 0.14	0.03
Helge Möllmann, MD ^c , Bogdan Ch	Calcified plaque			
Maren Weferling, MD ^b , Oliver Dör	Maximum angle (°)	234.5 ± 66.7	241.6 ± 88.1	0.68
Albrecht Elsässer, MD ^h , Christian Hamn	Mean angle (°)	110.6 ± 21.6	116.5 ± 29.6	0.61
	Mean thickness (mm)	0.61 ± 0.18	0.65 ± 0.10	0.48
	Maximum thickness (mm)	1.11 ± 0.21	1.11 ± 0.18	0.97
	Minimum thickness (mm)	0.24 ± 0.10	0.26 ± 0.11	0.56
	Minimum cap thickness (mm)	0.20 ± 0.07	0.18 ± 0.07	0.54
	Total length (mm)	16.02 ± 4.67	16.27 ± 6.04	0.68
	Total volume (mm ³)	45.66 ± 29.29	49.13 ± 24.02	0.82
	Red thrombus	0 (0)	0 (0)	>0.99
	White thrombus	2 (22.2)	3 (25.0)	0.80
	Fractures of calcified plaque present	4 (44.4)	10 (83.3)	0.15
	Number of calcified plaque fractures	1.67 ± 0.52	3.23 ± 0.49	<0.001
	Fractures of calcified plaque			
	Maximum depth (mm)	0.63 ± 0.41	0.72 ± 0.47	0.96
	Mean depth (mm)	0.55 ± 0.22	0.47 ± 0.18	0.66
	Maximum width (mm)	0.50 ± 0.19	0.60 ± 0.21	0.73
	Mean width (mm)	0.36 ± 0.07	0.36 ± 0.10	0.99
	Maximum length (mm)	2.20 ± 2.22	3.81 ± 1.42	0.06
	Mean length (mm)	0.57 ± 0.55	1.67 ± 0.43	0.01
	Maximum area (mm ²)	0.21 ± 0.05	0.26 ± 0.25	0.80
	Mean area (mm ²)	0.16 ± 0.07	0.14 ± 0.09	0.78
	Total volume (mm ³)	0.48 ± 0.27	1.47 ± 0.40	0.003
	Maximum angle (°)	21.3 ± 16.8	23.4 ± 14.6	0.85
	Mean angle (°)	13.4 ± 5.6	15.5 ± 6.2	0.70
	Mean angle of fractures/mean angle of calcified plaque (%)	5.10 ± 4.05	8.13 ± 5.60	0.29
	Dissections present	7 (77.8)	9 (75.0)	0.90
	Dissections (n)	2.00 ± 1.58	2.33 ± 1.78	0.60

Debulking techniques are often necessary for severe coronary intervention. The aim of this study was to compare final minimal stent area (MSA) and final lumen area (FLA) after rotational atherectomy (RA) using optical coherence tomography (OCT) in severely calcified lesions by coronary intravascular lithotripsy (IVL) randomized, prospective, double-blind study. The study compared final MSA and FLA after IVL and RA. The study included 100 patients with severe calcified lesions. The study found that IVL resulted in a significantly greater number of fractures compared to RA. The study also found that IVL resulted in a significantly greater acute lumen gain than RA. In conclusion, IVL induces more and longer fractures reserved. (Am J Cardiol 2023;197:93-100)

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Am J Cardiol 2023;197:93-100



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Cardiovascular Revascularization Medicine

Table 5
Final OCT analysis of calcified nodules.

	RA (n = 7)	IVL (n = 12)	P-value
Mean angle (°)	92 ± 17	89 ± 18	0.89
Max angle (°)	145 ± 55	138 ± 47	0.82
Mean nodule length (mm)	13.0 ± 4.9	11.8 ± 5.7	0.55
Mean nodule thickness (mm)	17.8 ± 7.8	16.5 ± 9.0	0.73
Mean nodule volume (mm ³)	0.66 ± 0.12	0.64 ± 0.19	0.94
Minimum lumen diameter (mm)	3.08 ± 0.58	2.91 ± 0.50	0.53
Minimum lumen area (mm ²)	7.68 ± 2.70	6.83 ± 2.29	0.5
Maximum lumen diameter (mm)	4.24 ± 0.77	4.37 ± 0.76	0.72
Maximum lumen area (mm ²)	14.51 ± 4.85	15.44 ± 5.37	0.71
Mean lumen diameter (mm)	3.65 ± 0.65	3.53 ± 0.44	0.68
Mean lumen area (mm ²)	10.81 ± 3.58	10.10 ± 2.51	0.65
Maximum lumen eccentricity	0.60 ± 0.08	0.55 ± 0.08	0.17
Minimum stent diameter (mm)	3.04 ± 0.59	2.80 ± 0.53	0.39
Minimum stent area (mm ²)	7.49 ± 2.74	6.35 ± 2.40	0.38
Maximum stent diameter (mm)	4.10 ± 0.79	4.00 ± 0.56	0.77
Maximum stent area (mm ²)	13.62 ± 4.91	12.78 ± 3.43	0.7
Mean stent diameter (mm)	3.57 ± 0.65	3.41 ± 0.46	0.59
Mean stent area (mm ²)	10.36 ± 3.53	9.42 ± 2.54	0.55
Maximum stent eccentricity	0.62 ± 0.10	0.61 ± 0.09	0.74
Mean reference diameter (mm)	3.10 ± 0.44	3.14 ± 0.50	0.87
Stent expansion	0.82 ± 0.13	0.79 ± 0.13	0.59
Stent malapposition present	7 (100)	12 (100)	>0.99
Maximum distance of malapposition (mm)	0.70 ± 0.14	0.76 ± 0.36	0.65
Mean area of malapposition (mm ²)	0.87 ± 0.61	0.70 ± 0.47	0.53
Mean lumen gain (mm ²)	4.16 ± 2.89	2.33 ± 2.01	0.29



Comparison of int
nodules: A sub-an

Florian Blachutzik^{a,b,*}
Helen Ullrich-Daub^d, I
Georg Nickenig^g, Mare
Holger Nef^{a,h}, on beha

Gori^d,
Adem Aksoy^g,
Hamm^{a,c},



Fig. 2. Eccentric drug-eluting stent after percutaneous coronary intervention of a calcified nodule using intravascular lithoplasty. The calcified nodule is marked with an asterisk.

Rotational Coronary Angioplasty vs Intravascular Lithotripsy in Calcified Lesions

Dr. Ricardo Andrés Costantini; Dr. Juan Manuel Telayna (h); Dr. Sofía Krause; Dr. Juan Manuel Telayna

INTRODUCTION

- Patients with **coronary calcification** have **worse prognosis**, even in non-significant obstructive coronary artery disease.
- Complex** percutaneous coronary interventions (PCI) represent a **significant percentage** of global interventions, with **severe calcification lesions counting for 25-35% of them**.
- The selection of endovascular devices to ablate parietal calcium volume, improve parietal compliance and luminal gain remains a challenge.

OBJECTIVE

Compare clinical and procedural outcomes of rotational coronary atherectomy against coronary intravascular lithotripsy.

METHODS

- 5002 PCI (2000-Nov 2022).
- Severe calcified lesions 365 (7.3%)
- Scoring balloon 83
- Rotational atherectomy 25**
- Intravascular lithotripsy 11**

RESULTS I

	Group A Rotational PCI (n=25)	Group B Lithotripsy (n=11)	p
Mean Age	74.6±8	69.9±12	
Female	2 (8%)	1 (9%)	
Diabetes	10 (40%)	5 (45%)	
LVEF	49.3±14.5	54.1±13	
Prior CABG	4 (16%)	0	
Transradial	7 (28%)	7 (64%)	0.06
8 Fr Sheath	16 (64%)	0	0.0006
LAD	10 (40%)	7 (64%)	
LCX	9 (36%)	1 (9%)	
RCA	3 (12%)	3 (27%)	
LM	3 (12%)	0	
≥ Wires	17 (68%)	3 (27%)	0.07
IVUS	5 (20%)	5 (45%)	
Target Lesion lenght	20.4±7.8	26.9±0.7	0.01
Stent lenght avg	45±31	52±28	
Stents per patient	2.1±1.5	2±1	
Contrast	233±93	166.9±89	0.05
Fluoroscopy time (min)	41±19	21.3±14	0.004
Cath Lab time (min)	144±48	99.7±39	0.01

RESULTS II

- Technical success 24(96) vs 10(91)
- Clinical success** 23(92) vs 10(91)
- Cardiovascular death 1(4) vs 1(9)
- Coronary perforation 1(4) vs 0.

CONCLUSION

- Coronary interventions in severe calcified lesions treated with rotational atherectomy did show no difference against those with intravascular lithotripsy in terms of technical or clinical results.
- The procedures with rotational atherectomy were more technically demanding: More cathlab and fluoro time and more amount of contrast used.

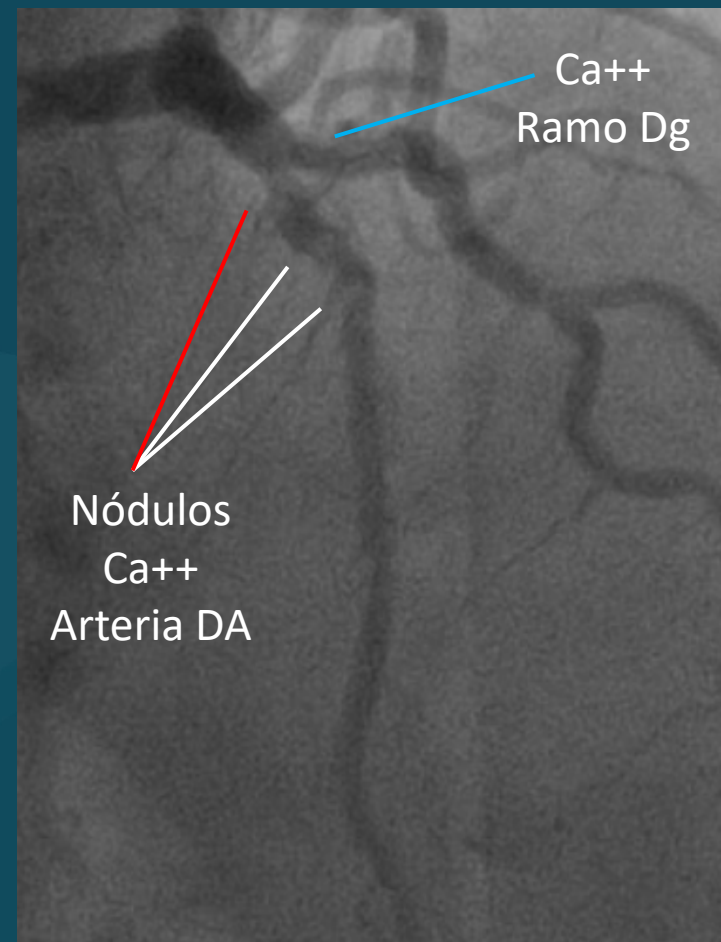


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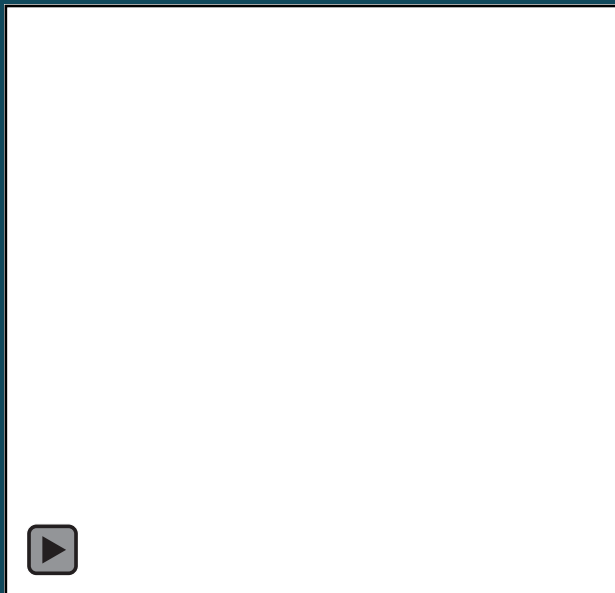
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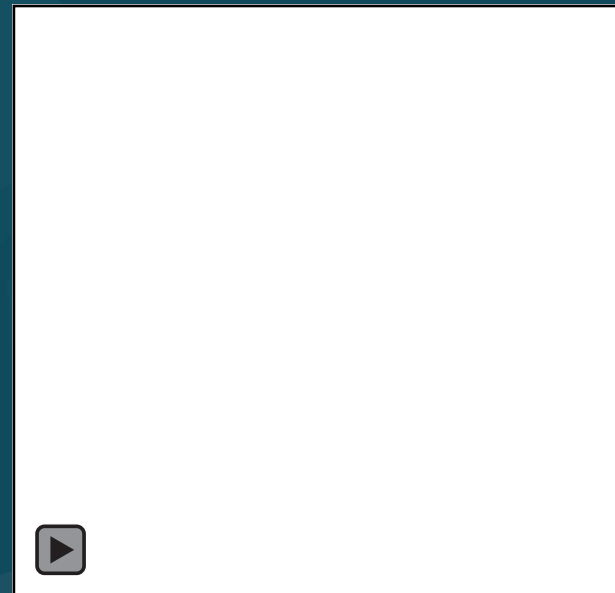


Imposibilidad de cruce
a vaso principal



Pre dilatación ramo secundario

Avance a lecho distal del
vaso principal

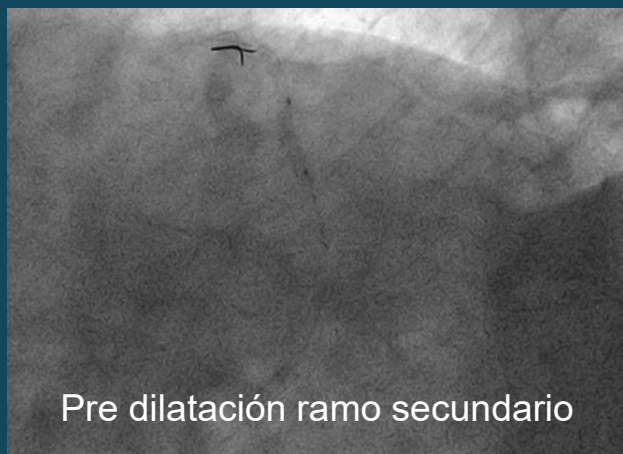




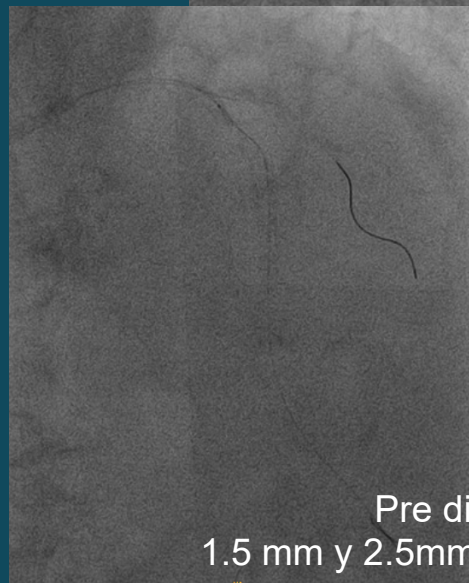
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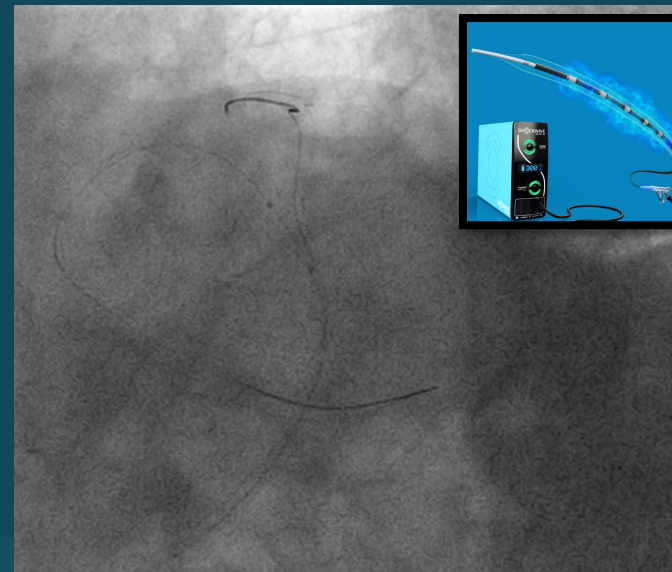
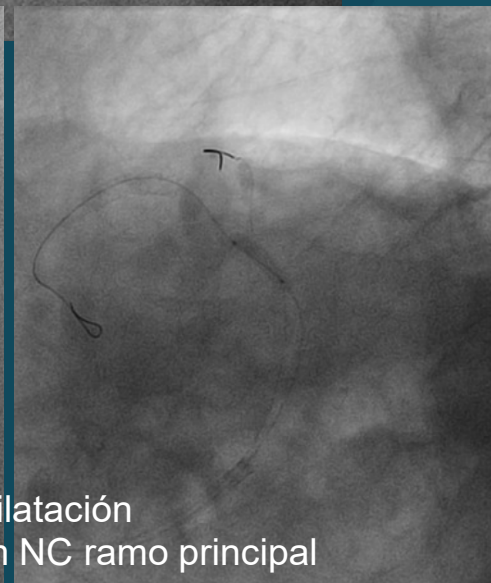
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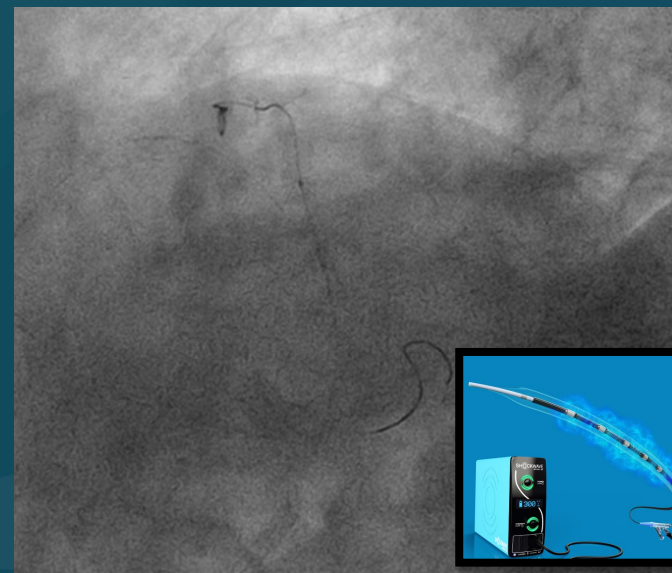
Pre dilatación ramo secundario



Pre dilatación
1.5 mm y 2.5mm NC ramo principal



Shockwave M5 3.0 mm
6 ciclos en ramo principal y ramo secundario



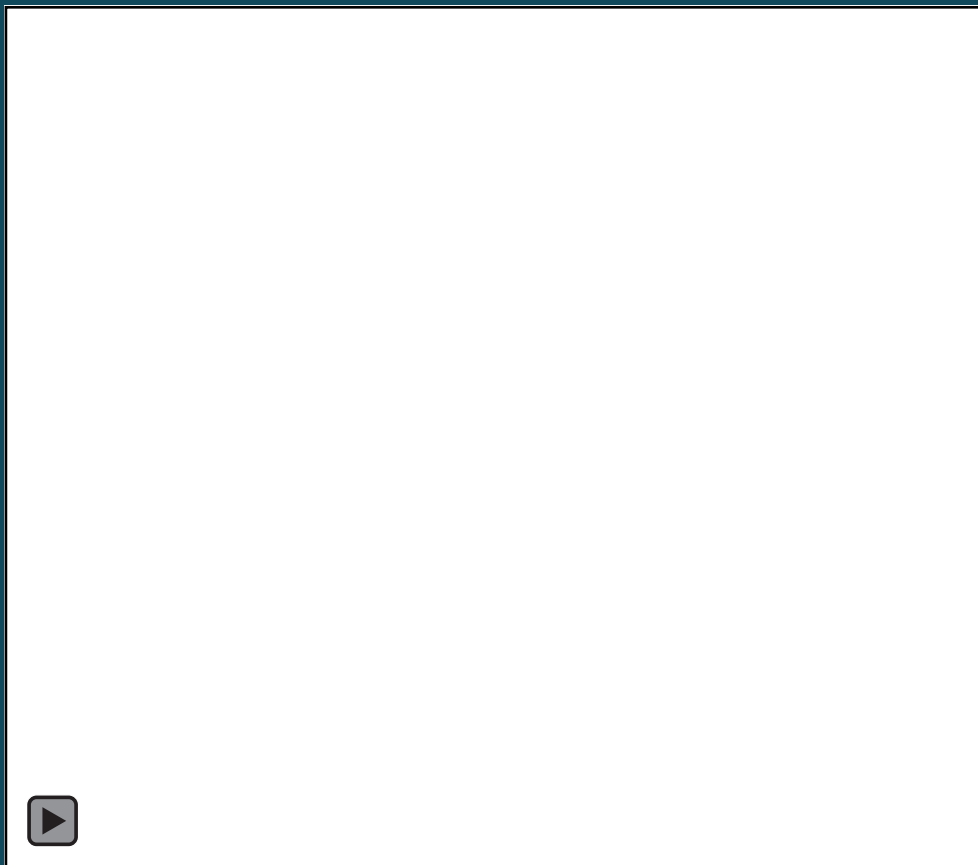


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Basal IVUS basal luego balón 2.5 mm predilatación



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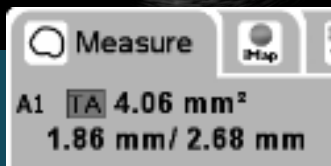
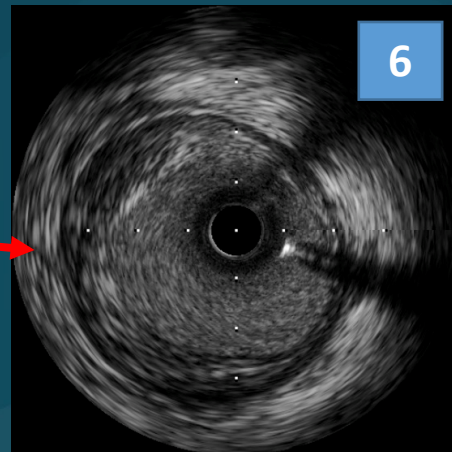
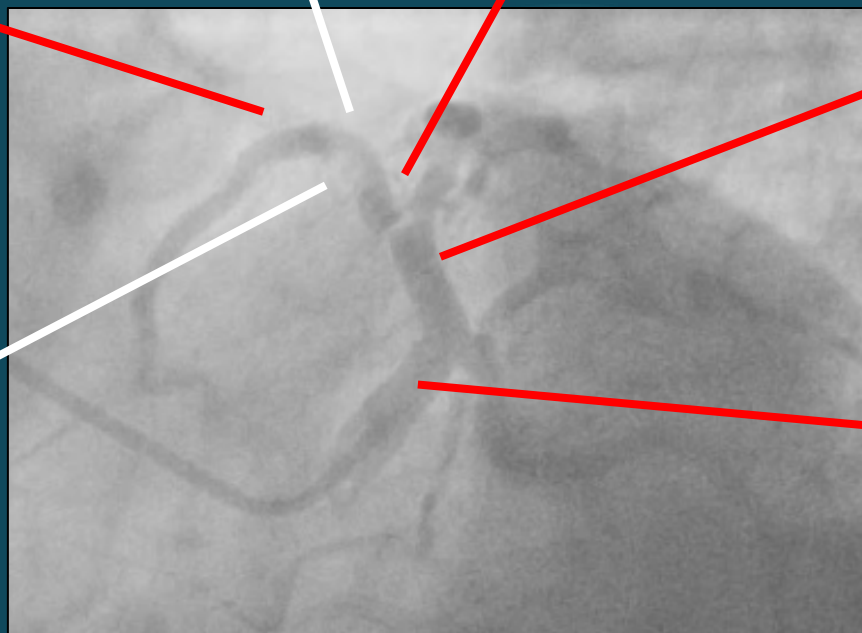
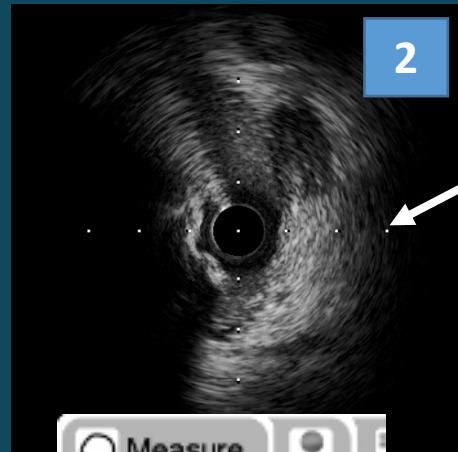
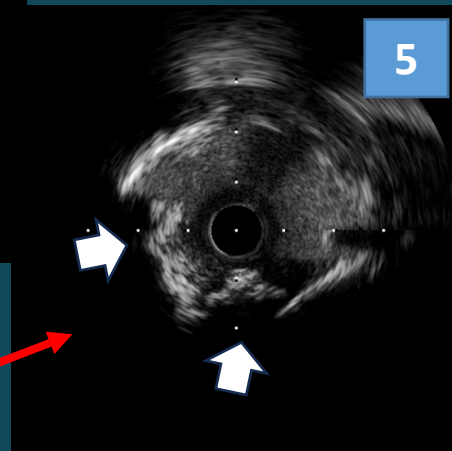
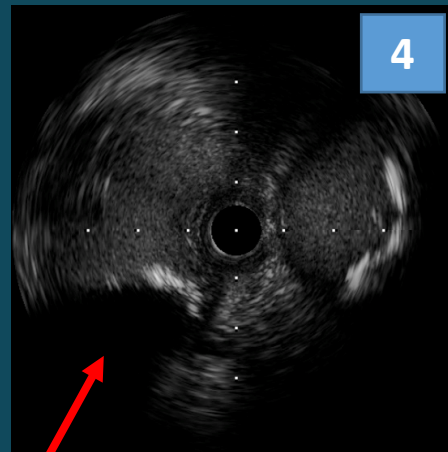
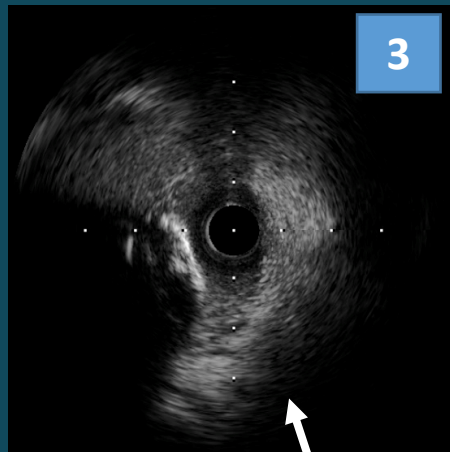
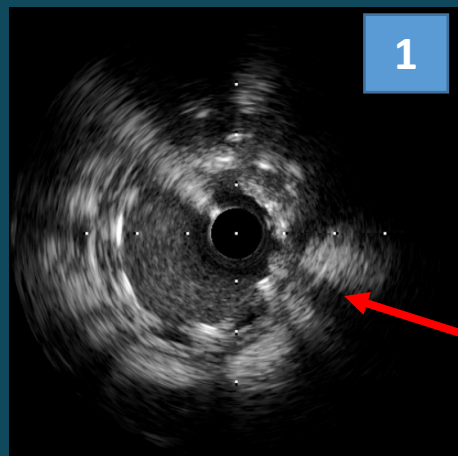


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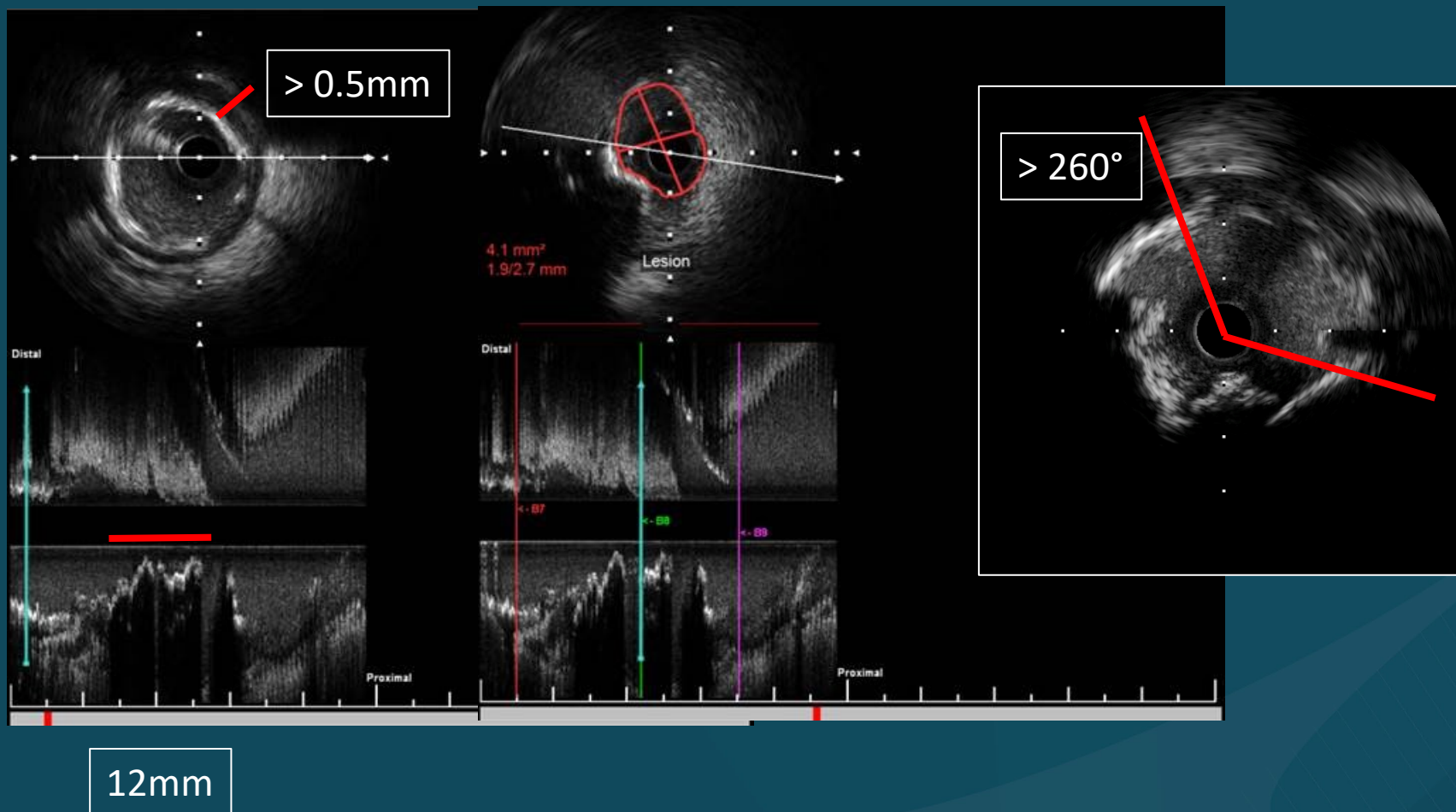


Basal IVUS basal luego balón 2.5 mm predilatación

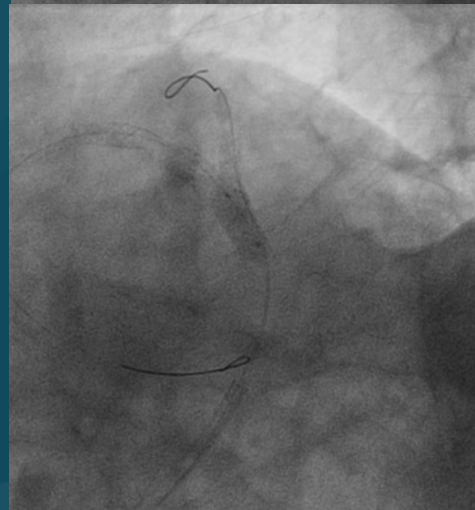
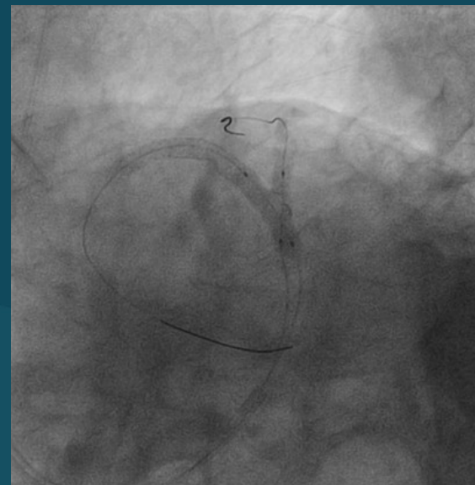
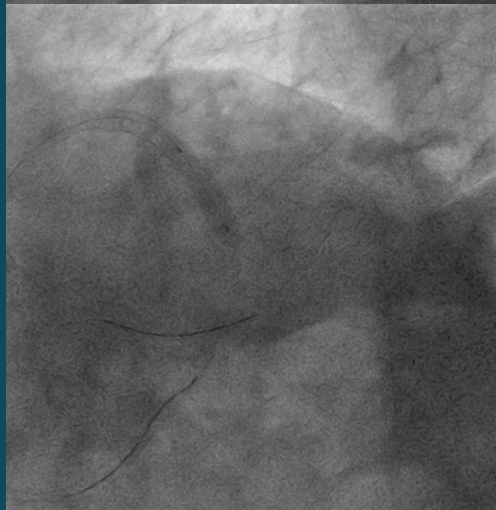
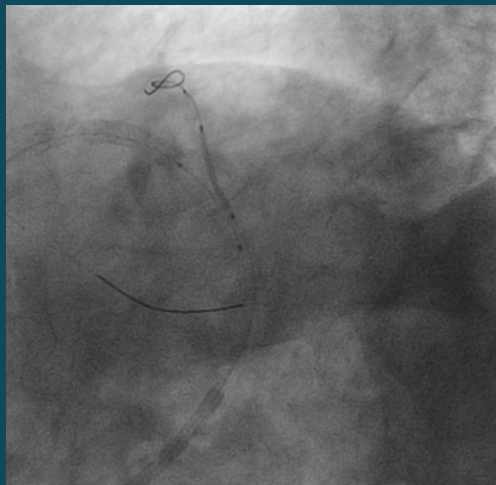


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DK Crusk
DES 3.0x15mm + 4.0x18mm + 4.5x26mm
POT 5.0x12





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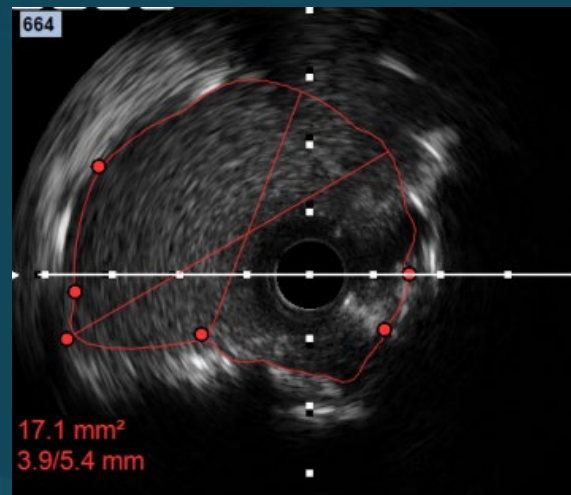
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IVUS final



IVUS Post Litotricia endovascular y Angioplastía Coronaria	Arteria descendente anterior - ramo principal
AREA DE LA LUZ	17.12 mm2
DIÁMETRO LUM MININO	3.95 mm

IVUS Post Litotricia endovascular y Angioplastía Coronaria	Arteria descendente anterior - ramo diagonal
AREA DE LA LUZ	6.20 mm2
DIÁMETRO LUM MININO	1.85 mm



Estrategia en lesiones desafiantes / calcificación grosera

Angiografía subestima calcificación (Sensibilidad 50% vs 90% IVUS) y: falta de suficiente resolución para detectar el subtipo;

Disminuir el umbral en la utilización de Imágenes intravasculares:

- caracterización de la distribución del calcio;
- calcificación concéntrica vs excéntrica / excéntrica más nódulos cálcicos;
- medir arco, longitud y grosor de calcificación;
- nódulos Ca++ (reprotrusión intrastent / perforación);

Selección de la modalidad de modificación / preparación de las lesiones calcificadas

Técnica optimizada del implante de stents

"Pero sobre todas las cosas
la verdad lleva la victoria"

