Imaging Guided PCI vs. Angio Guided PCI Focusing on OCT

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Disclosure

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Background

- Previous trials (CTO-IVUS, AVIO, HOME-DES-IVUS, IVUS-XPL, and ULTIMATE) have shown lower rates of major adverse clinical events after intravascular ultrasound (IVUS)-guided percutaneous coronary intervention (PCI) than after angiography-guided PCI but have not been considered definitive owing to limited sample size, short follow-up duration, or the inclusion of highly selected coronary-lesion subsets.
- Our group has already reported the long-term benefit of the use of IVUS in patients undergoing complex PCI in an observational study.[1]

However, a randomized trial is needed to confirm the benefit of intravascular imaging-guided PCI in patients with complex coronary artery lesions.

1. Choi KH, Song YB, …, Hahn JY. JACC Cardiovasc Interv. 2019

Study Objective

- To investigate whether intravascular imaging-guided PCI using IVUS or optical coherence tomography (OCT) would improve clinical outcomes compared with angiography-guided PCI in patients with complex coronary artery lesions.

Working Hypothesis

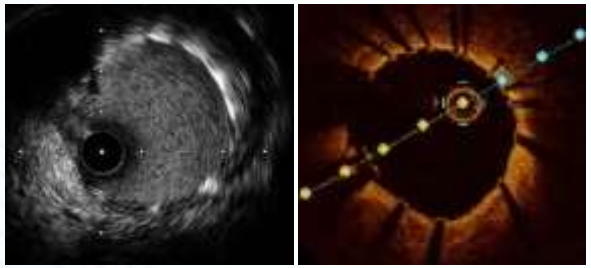
Intravascular imaging-guided PCI would reduce target vessel failure (a composite of cardiac death, target vessel-related myocardial infarction, and target vessel revascularization), compared with angiography-guided PCI in treatment of patients with complex coronary artery lesions.

Study Design

RENOVATE-COMPLEX-PCI (NCT03381872)

An investigator-initiated, prospective, multicenter, randomized, open-label trial at 20 sites in Korea

Patients with Complex Coronary Artery Lesions Undergoing PCI



Randomization (2:1) for Treatment Strategy of Target Lesions

Imaging-Guided Strategy

Angiography-Guided Strategy

Primary end point: target vessel failure
All patients were followed until 1 year after last patient enrollment.

Inclusion and Exclusion Criteria

INCLUSION

1. Patients (≥ 19 years) with coronary artery disease requiring PCI
2. Patients with a **complex coronary artery lesion** defined as:
   - True bifurcation lesion (Medina 1,1,1/1,0,1/0,1,1) with side branch ≥2.5mm
   - Chronic total occlusion (≥3 months) as target lesion
   - Unprotected LM disease PCI (LM ostium, body, distal LM bifurcation including non-true bifurcation)
   - Long coronary lesions (implanted stent ≥38 mm in length)
   - Multi-vessel PCI (≥2 vessels treated at one PCI session)
   - Multiple stents needed (≥3 more stent per patient)
   - In-stent restenosis lesion as target lesion
   - Severely calcified lesion (encircling calcium in angiography)
   - Ostial coronary lesion (LAD, LCX, RCA)

KEY EXCLUSION

1. Target lesions not amenable to PCI by operators' decision
2. Cardiogenic shock (Killip class IV) at presentation
3. Intolerance to Aspirin, Clopidogrel, Prasugrel, Ticagrelor, Heparin, or Everolimus
4. Known true anaphylaxis to contrast medium (not allergic reaction but anaphylactic shock)
5. Pregnancy or breast feeding
6. Non-cardiac co-morbid conditions are present with life expectancy <1 year or that may result in protocol non-compliance (per site investigator's medical judgment)
7. Unwillingness or inability to comply with the procedures described in this protocol.

PCI and Intravascular Imaging

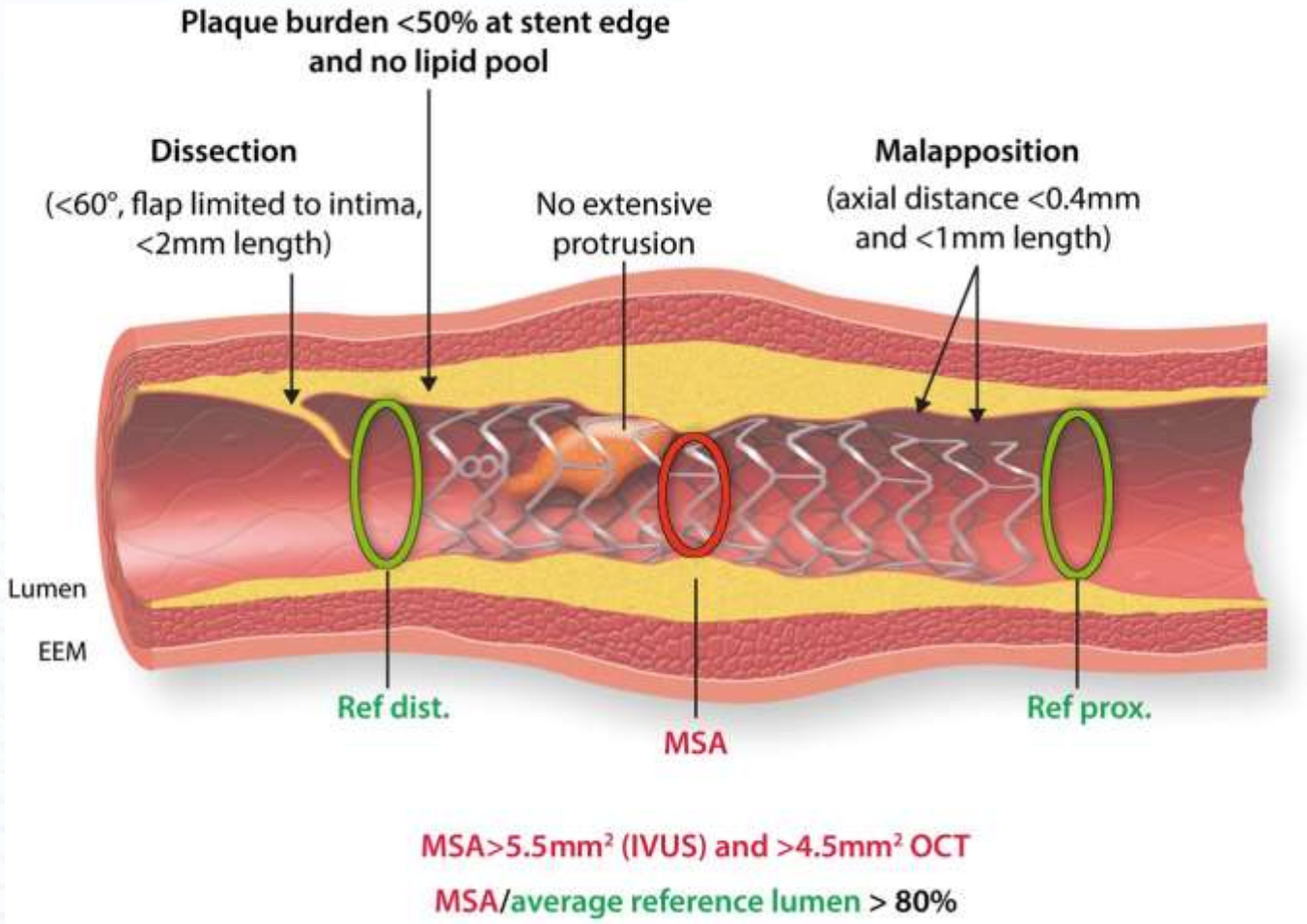
- PCI and Intravascular image acquisition were performed with the use of standard techniques.
  - Intracoronary NG
  - Automatic pullback

- For patients who had been assigned to the intravascular imaging group, the choice of IVUS or OCT was made at the operators' discretion.

- Intravascular imaging could be used at any time during the PCI procedure but was mandated after stent implantation to determine whether the stented segment was optimized.

Criteria of PCI Optimization by Intravascular Imaging

An expert consensus document of the European Association of PCI[1]



- Standardized protocols for selection of reference size, stent size, and length
- In left main lesions, MSA >7 mm^2 for a distal left main coronary artery stenosis and >8 mm^2 for a proximal left main coronary artery stenosis
- If stent optimization did not occur, additional dilation of the stent or additional stent implantation was recommended, and repeat evaluation on intravascular imaging was mandated.

1. Raber L, Mintz GS, Koskinas KC, et al. Eur Heart J 2018;39:3281-300.

Study End Points

Primary End Point

- **Target vessel failure**
  - A composite of cardiac death, target vessel-related MI, or clinically-driven target vessel revascularization.

Secondary End Points

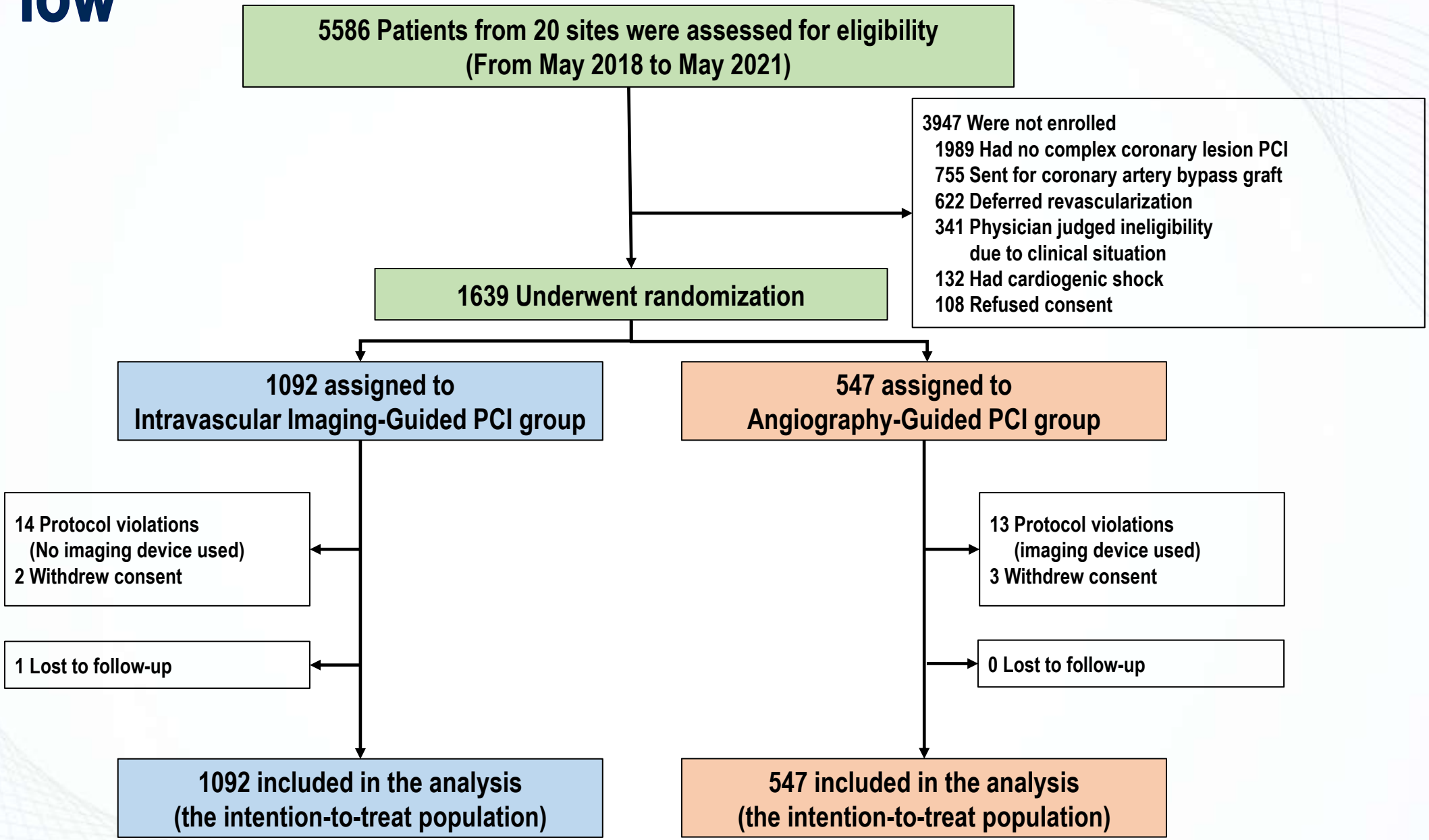
- Target vessel failure without procedure-related MI
- Cardiac death or target vessel-related MI
- Target vessel-related MI with or without procedure-related MI
- Non-target vessel-related MI
- Any MI with or without procedure-related MI
- Target lesion revascularization
- Target vessel revascularization
- Any revascularization (clinically-driven)
- Definite stent thrombosis
- Total amount of contrast
- Incidence of contrast-induced nephropathy
- Total procedural time
- Total medical cost (not reported in this publication)

Definition of Clinical Events

- Spontaneous MI according to 3rd Universal Definition[1]
- Other clinical events according to ARC-2 criteria[3]
- Procedure-related MI according to SCAI Definition[2]

1. Garcia-Garcia HM, McFadden EP, Farb A, et al. Circulation 2018;137:2635-50.
2. Thygesen K, Alpert JS, Jaffe AS, et al. Circulation 2012;126:2020-35.
3. Moussa ID, Klein LW, Shah B, et al. J Am Coll Cardiol 2013;62:1563-70.

Study Flow


5586 Patients from 20 sites were assessed for eligibility
(From May 2018 to May 2021)
3947 Were not enrolled
1989 Had no complex coronary lesion PCI
755 Sent for coronary artery bypass graft
622 Deferred revascularization
341 Physician judged ineligibility due to clinical situation
132 Had cardiogenic shock
108 Refused consent
1639 Underwent randomization
1092 assigned to Intravascular Imaging-Guided PCI group
547 assigned to Angiography-Guided PCI group
14 Protocol violations
(No imaging device used)
2 Withdrew consent
1 Lost to follow-up
13 Protocol violations
(imaging device used)
3 Withdrew consent
0 Lost to follow-up
1092 included in the analysis
(the intention-to-treat population)
547 included in the analysis
(the intention-to-treat population)

Baseline Clinical Characteristics

Characteristics	Total (N=1639)	Imaging-guided PCI (N=1092)	Angio-guided PCI (N=547)
Age — yr	65.6±10.2	65.3±10.3	66.0±10.0
Male — n (%)	1300 (79.3)	869 (79.6)	431 (78.8)
Initial presentation — no. (%)			
Stable ischemic heart disease	807 (49.2)	532 (48.7)	275 (50.3)
Acute coronary syndrome	832 (50.8)	560 (51.3)	272 (49.7)
Unstable angina	534 (32.6)	361 (33.1)	173 (31.6)
Acute myocardial infarction	298 (18.2)	199 (18.2)	99 (18.1)
Non-ST-segment elevation myocardial infarction	258 (15.7)	171 (15.7)	87 (15.9)
ST-segment elevation myocardial infarction	40 (2.4)	28 (2.6)	12 (2.2)
Medical history — no. (%)			
Hypertension	1005 (61.3)	682 (62.5)	323 (59.0)
Diabetes mellitus	617 (37.6)	394 (36.1)	223 (40.8)
Dyslipidemia	840 (51.3)	560 (51.3)	280 (51.2)
Current smoking	307 (18.7)	212 (19.4)	95 (17.4)
Chronic renal insufficiency	296 (18.1)	203 (18.6)	93 (17.0)
Previous PCI	395 (24.1)	268 (24.5)	127 (23.2)
Previous myocardial infarction	117 (7.1)	75 (6.9)	42 (7.7)
LV ejection fraction —(%)	58.7±11.6	58.4±11.9	59.3±11.0

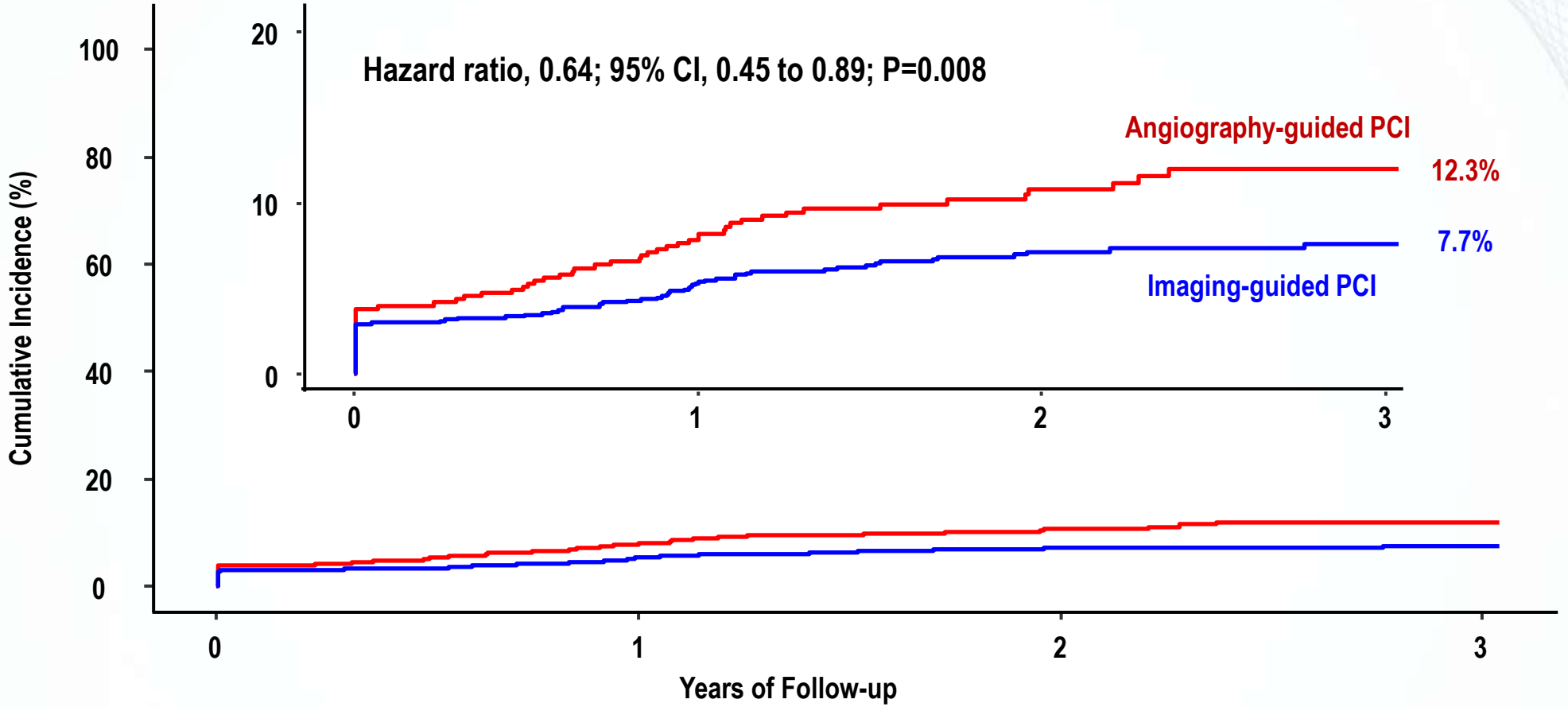
Baseline Angiographic and Procedural Characteristics

Characteristics	Total (N=1639)	Imaging-guided PCI (N=1092)	Angio-guided PCI (N=547)
Complex coronary lesions — no. (%)			
True bifurcation lesion with side branch ≥2.5mm	359 (21.9)	233 (21.3)	126 (23.0)
Chronic total occlusion (≥3 months)	319 (19.5)	220 (20.1)	99 (18.1)
Unprotected left main coronary artery disease	192 (11.7)	138 (12.6)	54 (9.9)
Long coronary lesion (implanted stent ≥38 mm in length)	898 (54.8)	617 (56.5)	281 (51.4)
Multivessel PCI (≥2 vessels treated at one PCI session)	622 (37.9)	409 (37.5)	213 (38.9)
Multiple stents (≥3 more stent per patient)	305 (18.6)	208 (19.0)	97 (17.7)
In-stent restenosis	236 (14.4)	158 (14.5)	78 (14.3)
Severely calcified (encircling calcium in angiography)	231 (14.1)	157 (14.4)	74 (13.5)
Ostial coronary lesion (LAD, LCX, RCA)	251 (15.3)	182 (16.7)	69 (12.6)
Number of vessels with disease — no. (%)			
1-vessel disease	526 (32.1)	342 (31.3)	184 (33.6)
2-vessel disease	621 (37.9)	420 (38.5)	201 (36.7)
3-vessel disease	492 (30.0)	330 (30.2)	162 (29.6)
Procedural characteristics			
Radial artery access — no. (%)	1253 (76.4%)	827 (75.7%)	426 (77.9%)
Intravascular imaging devices used — no./total no. (%) †	1091/1639 (66.6)	1078/1092 (98.7)	13/547 (2.4)
Intravascular ultrasound	813/1091 (74.5)	800/1078 (74.2)	13/13 (100.0)
Optical coherence tomography	278/1091 (25.5)	278/1078 (25.8)	0/13 (0.0)
Volume of contrast media used — ml	207.3±116.5	214.2±118.5	193.7±111.3
Procedural time — min	65.0 (47.0-89.0)	70.0 (51.0-95.0)	53.5 (40.0-75.0)
Procedural success — no. (%)	1613 (98.4)	1073 (98.3)	540 (98.7)

Lesion-level Analysis

Characteristic	Total (N=2438)	Imaging-guided PCI (N=1623)	Angiography-guided PCI (N=815)
Quantitative coronary angiography			
Pre-PCI QCA			
Proximal reference vessel diameter — mm	3.2±0.5	3.2±0.5	3.1±0.5
Distal reference vessel diameter — mm	2.7±0.5	2.7±0.5	2.7±0.4
Minimum lumen diameter — mm	0.44±0.37	0.44±0.37	0.44±0.36
Diameter stenosis — %	85.4±11.6	85.4±11.5	85.2±11.7
Lesion length — mm	27.9±15.6	28.4±15.9	26.8±14.8
Post-PCI QCA			
Minimum lumen diameter — mm	2.8±0.5	2.8±0.5	2.7±0.5
Diameter stenosis — %	9.8±8.8	9.8±8.9	10.0±8.6
Post-PCI residual stenosis<10% — no. (%)	1638/2346 (69.8)	1098/1560 (70.4)	540/786 (68.7)
Profile of intravascular imaging use — no./total no. (%)			
Pre-PCI evaluation only	18/1569 (1.1)	16/1549 (1.0)	2/20 (10.0)
Post-PCI evaluation only	371/1569 (23.6)	366/1549 (23.6)	5/20 (25.0)
Both pre- and post-PCI evaluation	1180/1569 (75.2)	1167/1549 (75.3)	13/20 (65.0)
Adjunctive non-compliant balloon used — no. (%)	1351 (55.4)	980 (60.4)	371 (45.5)
Size of adjunctive balloon — mm	3.5±0.6	3.5±0.6	3.5±0.5
Maximum inflation pressure — atm	18.9±4.6	18.7±4.6	19.2±4.6

Primary End Point



Number at risk				
Angiography-guided PCI	547	496	280	120
Imaging-guided PCI	1092	1023	591	255

Primary and Secondary End Points

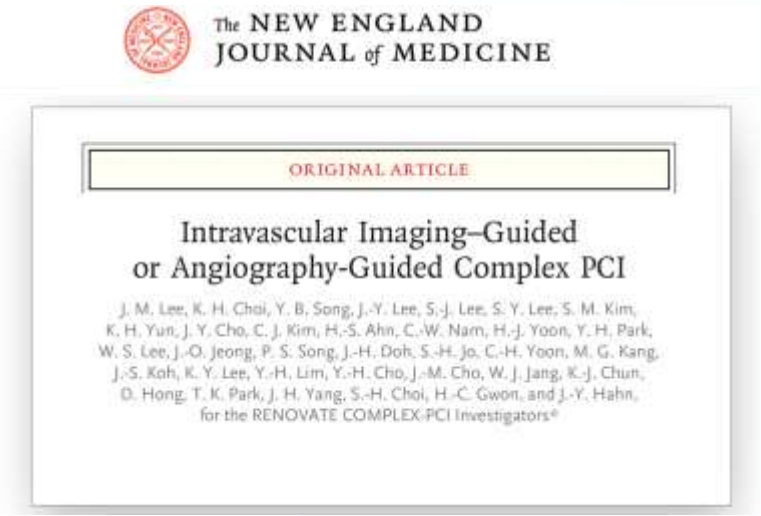
End Point	Total (N=1639)	Imaging-guided PCI (N=1092)	Angiography-guided PCI (N=547)	Hazard Ratio (95% CI)*	P Value
Primary end point — no. (%)					
Target vessel failure	**136 (9.2)**	**76 (7.7)**	**60 (12.3)**	**0.64 (0.45-0.89)**	**0.008**
Secondary end points — no. (%)					
Target vessel failure without procedure-related MI	88 (6.3)	48 (5.1)	40 (8.7)	0.59 (0.39-0.90)	
Cardiac death or target-vessel related MI	96 (6.4)	53 (5.3)	43 (8.5)	0.63 (0.42-0.93)	
All-cause death	70 (5.6)	42 (5.3)	28 (6.4)	0.71 (0.44–1.15)	
Cardiac death	33 (2.4)	16 (1.7)	17 (3.8)	0.47 (0.24-0.93)	
Myocardial infarction	75 (5.0)	43 (4.4)	32 (6.2)	0.78 (0.48-1.25)	
Target-vessel related MI	68 (4.3)	38 (3.7)	30 (5.6)	0.74 (0.45-1.22)	
Spontaneous MI	17 (1.2)	8 (0.9)	9 (1.8)	0.66 (0.23-1.90)	
Procedure-related MI	52 (3.2)	30 (2.7)	22 (4.0)	0.77 (0.43-1.35)	
Non-target vessel related MI	8 (0.8)	5 (0.8)	3 (0.8)	1.24 (0.24-6.40)	
Repeat revascularization	87 (6.6)	55 (6.3)	32 (7.1)	0.95 (0.60-1.48)	
Target vessel revascularization	57 (4.1)	32 (3.4)	25 (5.5)	0.69 (0.40-1.18)	
Target lesion revascularization	44 (3.2)	24 (2.6)	20 (4.4)	0.66 (0.36-1.22)	
Definite stent thrombosis	5 (0.3)	1 (0.1)	4 (0.7)	0.25 (0.02-2.75)	
Contrast induced nephropathy†	40 (2.4)	26 (2.4)	14 (2.6)	0.99 (0.51-1.92)	

Limitations

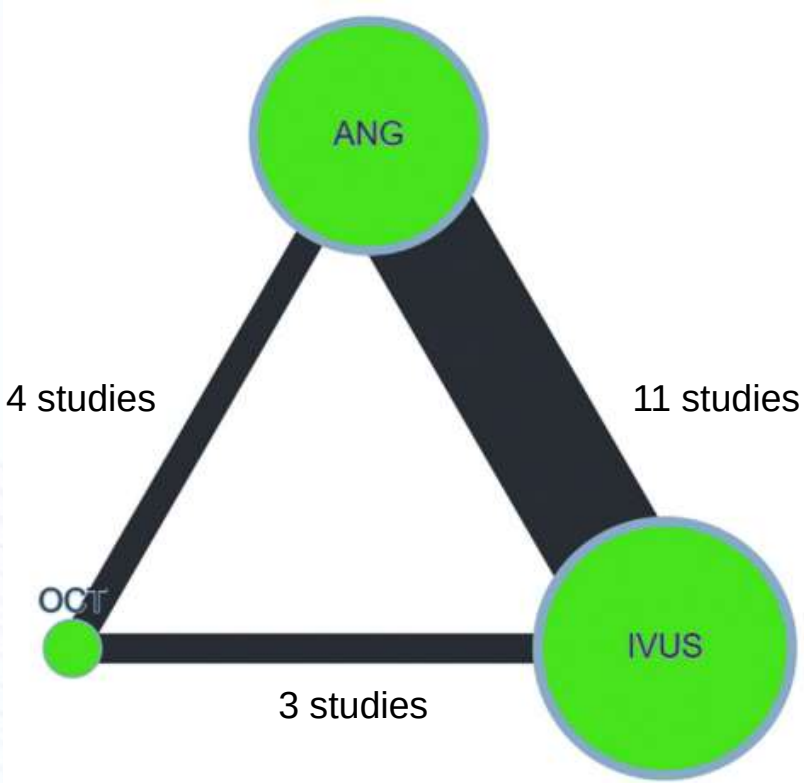
- The trial was unblinded, and it was not possible for the operators to be unaware of the patient's assigned trial group. However, we minimized the risk of bias by using an end-point analysis with precisely defined criteria, by having angiographic and imaging analyses performed at the core laboratories, and by having clinical events adjudicated by a committee.
- Intravascular imaging-defined stent optimization was achieved in only 45.4% of patients. One possible explanation may be that we focused our trial only on complex coronary artery lesions.
- Given patients in the angiography-guided PCI group did not undergo intravascular imaging, we could assess stent optimization in this group only by means of QCA.

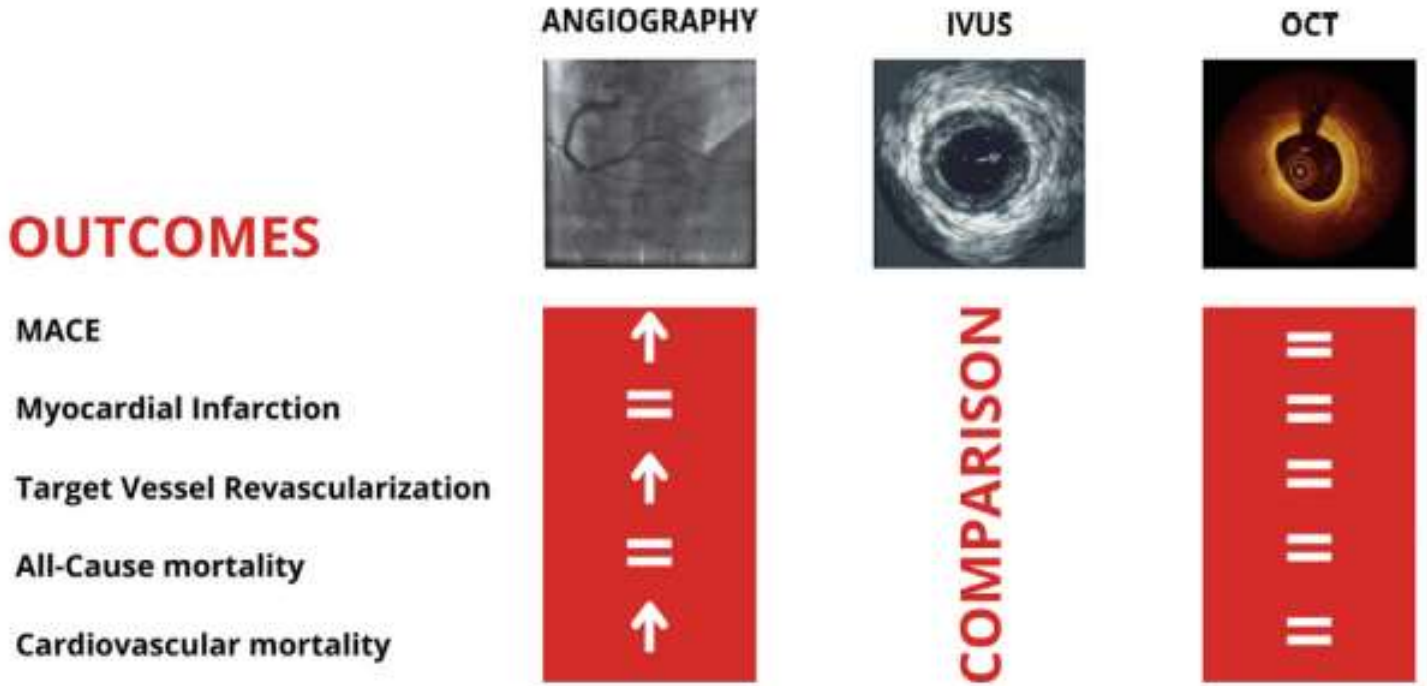
Conclusion

- ***Among patients with complex coronary artery lesions,*** **intravascular imaging-guided PCI reduced a composite of cardiac death, target vessel-related myocardial infarction, or clinically driven target vessel revascularization** compared with **angiography-guided PCI.**
- The **RENOVATE-COMPLEX-PCI** supports the intravascular imaging-guided PCI in patients with complex coronary lesions.



Network Meta-analysis: IVUS vs. OCT vs. Angiography





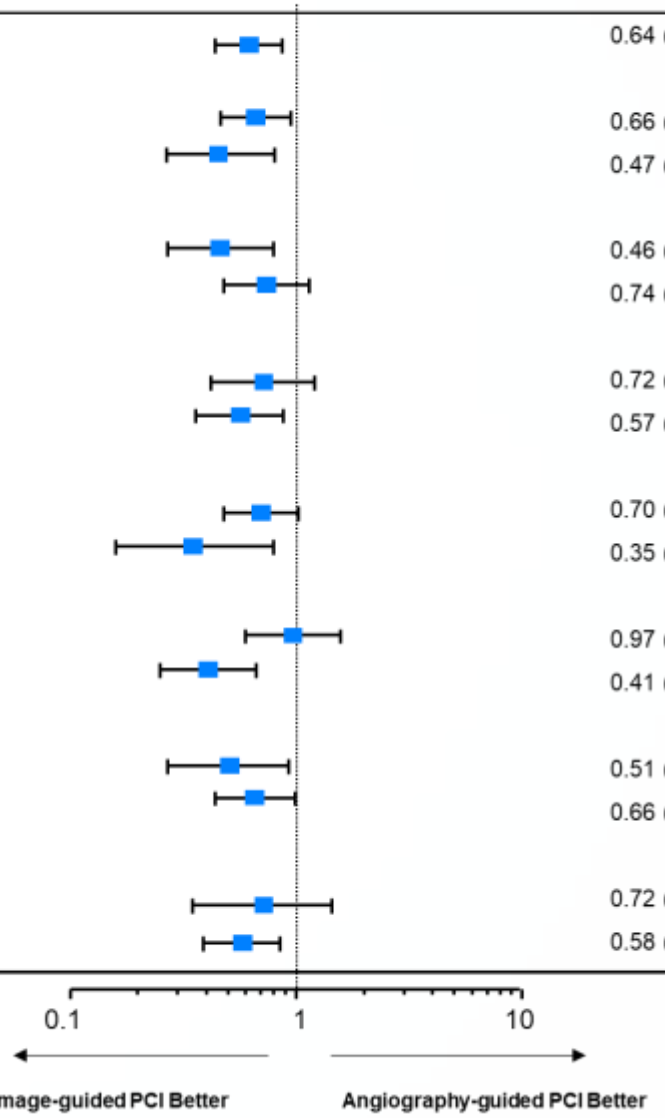
JSCAI 2022;1:100507

Table 1. Baseline characteristics.

Study Name	HOME DES IVUS[17]		AVIO[18]		RESET[19]		CTO-IVUS[20]		Tan et al[21]		AIR-CTO[22]		OPINION[12]		DOCTORS[15]		ROBUST sub-analysis[23]		Liu et al[24]		IVUS-XPL[25]		ULTIMATE[16]		ILUMIEN III: OPTIMIZE PCI[26]			iSIGHT[27]		
Year	2010		2012		2013		2015		2015		2015		2016		2016		2018		2019		2020		2021		2021			2021		
Study design	Single-center, prospective, randomized		Randomized, multicenter, open-labeled		Prospective, randomized, open-labeled, multicenter, noninferiority trial		Prospective, multicenter, randomized		Single-center, open-labeled, randomized		Randomized, multicenter		Multicenter, prospective, randomized, controlled, open-labeled, parallel, noninferiority trial		Multicenter, randomized, prospective		Multicenter, randomized, open-labeled		Randomized, open-labeled, single-blind		Randomized, multicenter		Multicenter, prospective, randomized		Randomized, single-blinded, open-labeled			Prospective, randomized, active-controlled, noninferiority, single-center trial		
Region	Czech Republic		International		South Korea, United States		Korea		China		China		Japan		France				China		South Korea		China, United States		8 countries			Brazil		
Recruitment period	Jan 2004 – Dec 2005		May 2008 – Jul 2011				Mar 2012 – Aug 2013		Oct 2009 – Sep 2012		Oct 2010 – Nov 2011		Jun 2013 – Dec 2015		Sep 2013 – Dec 2015		Feb 2011 – Oct 2012		Dec 2010 – Dec 2015		Oct 2010 – Jul 2014		Aug 2014 – Oc 2020		May 2015 – Apr 2016			Jan 2015 – Dec 2016		
Follow-up	18 months		2 years		1 year (Intention-to-treat basis)		1 year		2 years		2 years		1 year		6 months		9 months		1 year		5 year		3 year		1 year			1 year		
Comparison	Angio	IVUS	IVUS	Angio	IVUS	Angio	IVUS	Angio	Angio	IVUS	IVUS	Angio	OCT	IVUS	Angio	IVUS	OCT	Angio	IVUS	Angio	IVUS	Angio	IVUS	Angio	OCT	IVUS	Angio	OCT	IVUS	Angio
Sample size	105	105	142	142	269	274	201	201	62	61	115	115	412	405	120	120	105	96	167	169	700	700	724	724	153	136	142	51	51	49
Baseline characteristics																														
Age, y	60.2 ± 11	59.4 ± 13	63.9 ± 10.1	63.6 ±11.0	62.8 ± 9.3	64.3 ± 8.7	61.0 ± 11.1	61.4 ± 10.1	75.85 ± 3.49	76.54 ± 4.95	67 ±10	66 ± 11	69 ± 9	68 ± 9	60.2 ± 11.3	60.8 ± 11.5	57 (46-70)	59 (47-72)	65.3 ± 10.6	64.9 ± 11.2	64 ± 9	64 ± 9	65.2 ± 10.9	65.9 ± 9.8	66 (59-72)	66 (61-73)	67 (56-75)	59.92 ± 8.92	59.32 ± 10.37	58.59 ± 10.2
Male	75 (71)	77 (73)	117 (82)	109 (77)	177 (65.8)	150 (54.7)	162 (80.6)	162 (80.6)	43 (70)	38 (62)	102 (88.7)	92 (80.0)	315 (76.5)	322 (79.5)	91 (75.8)	95 (79.2)	87 (83)	84 (87)	106 (63.5)	108 (63.9)	483 (69)	481 (69)	535 (73.9)	530 (73.2)	106 (69)	101 (74)	104 (73)	31 (60.8)	36 (72.0)	38 (77.5)
Comorbidities																														
Hypertension	75 (71)	70 (67)	100 (70.4)	95 (66.9)	165 (61.3)	178 (65.8)	126 (62.7)	128 (63.7)	29 (46.8)	25 (41.0)	86 (74.8)	81 (70.4)	315 (76.5)	299 (73.8)	50 (41.7)	67 (55.8)	53 (50)	50 (52)	116 (69.5)	122 (72.2)	454 (65)	444 (63)	512 (70.7)	521 (72.0)	119 (78)	106 (78)	107 (75)	46 (90.2)	42 (84)	39 (79.6)
Dyslipidemia	69 (66)	66 (63)	100 (70.4)	109 (76.8)	165 (61.3)	165 (61.7)					25 (21.9)	32 (27.8)	316 (76.7)	321 (79.3)	56 (46.7)	59 (49.2)			63 (37.7)	64 (37.9)	471 (67)	458 (65)	389 (53.7)	400 (55.2)	112 (73)	102 (75)	109 (77)	36 (70.6)	30 (60)	28 (57.2)
Diabetes mellitus	47 (45)	44 (42)	34 (23.9)	38 (26.8)	85 (31.6)	82 (29.9)	70 (34.8)	68 (33.8)	18 (29.5)	21 (34.4)	34 (29.6)	31 (27.0)	169 (41.0)	165 (40.7)	19 (15.8)	26 (21.7)	18 (17)	25 (26)	56 (33.5)	52 (30.8)	250 (36)	256 (37)	217 (30.0)	226 (31.2)	50 (33)	49 (36)	40 (28)	17 (33.3)	20 (40)	22 (44.9)
Current smoker	37 (35)	42 (40)	49 (34.5)	44 (31.0)	58 (21.6)	47 (17.2)	71 (35.3)	69 (34.3)	29 (46.8)	27 (44.3)	45 (39.1)	45 (39.1)	67 (16.3)	73 (18.0)	51 (42.5)	47 (39.2)	67 (64)	57 (59)	62 (37.1)	60 (35.5)	155 (22)	181 (26)	253 (34.9)	228 (31.5)	26 (17)	18 (13)	33 (23)	17 (33.3)	14 (28)	14 (28.6)
Ischemic stroke									9 (14.8)	8 (13.1)	0	4 (3.5)							5 (3.0)	4 (2.4)			85 (11.7)	85 (11.7)						
Prior cardiac history																														
Prior MI	34 (32)	39 (37)			3 (1.1)	8 (2.9)	16 (8.0)	16 (8.0)	13 (21.0)	10 (16.4)	24 (20.9)	35 (30.4)	70 (17.0)	61 (15.1)			1 (1)	6 (6)	29 (17.4)	24 (14.2)	34 (5)	29 (4)	67 (9.3)	86 (11.9)	35 (22)	29 (20)	32 (22)			
Prior PCI	15 (14)	18 (17)					31 (15.4)	32 (15.9)			23 (20.0)	24 (20.9)	140 (34.0)	140 (34.6)			4 (4)	3 (4)	33 (19.8)	28 (16.6)	76 (11)	69 (10)	126 (17.4)	144 (19.9)	11 (7)	8 (5)	15 (10)			
Prior CABG	11 (10)	15 (14)					3 (1.5)	5 (2.5)			3 (2.6)	5 (4.3)	7 (1.7)	9 (2.2)			0	0	2 (1.2)	2 (1.2)	20 (3)	16 (2)	10 (1.4)	8 (1.1)	3 (2)	11 (8)	8 (5)			
Clinical presentation																														
Stable angina	42 (40)	40 (38)			143 (53.2)	141 (51.5)			21 (34)	18 (30)	82 (71.3)	87 (75.7)	363 (88.1)	352 (86.9)					20 (12.0)	18 (10.7)	358 (51)	356 (51)	512 (70.7)	521 (72.0)	52 (34)	48 (35)	50 (36)	22 (43.1)	18 (36)	21 (42.9)
Unstable angina	41 (39)	45 (43)	42 (29.6)	37 (26.1)	102 (37.9)	106 (38.7)			41 (66)	43 (71)	10 (8.7)	11 (9.6)	48 (11.7)	53 (13.1)	9 (7.5)	10 (8.3)			127 (76.0)	126 (74.6)	242 (35)	226 (32)	389 (53.7)	400 (55.2)	25 (16)	33 (23)	27 (18)	20 (39.2)	22 (44)	16 (32.6)
Acute MI	22 (21)	31 (29)			24 (8.9)	27 (9.9)					23 (20.0)	17 (14.8)							17 (10.2)	21 (12.4)	100 (14)	118 (17)	217 (30.0)	226 (31.2)				9 (17.7)	10 (20.0)	12 (24.5)
NSTEMI																							253 (34.9)	228 (31.5)						
Silent ischemia																							85 (11.7)	85 (11.7)						

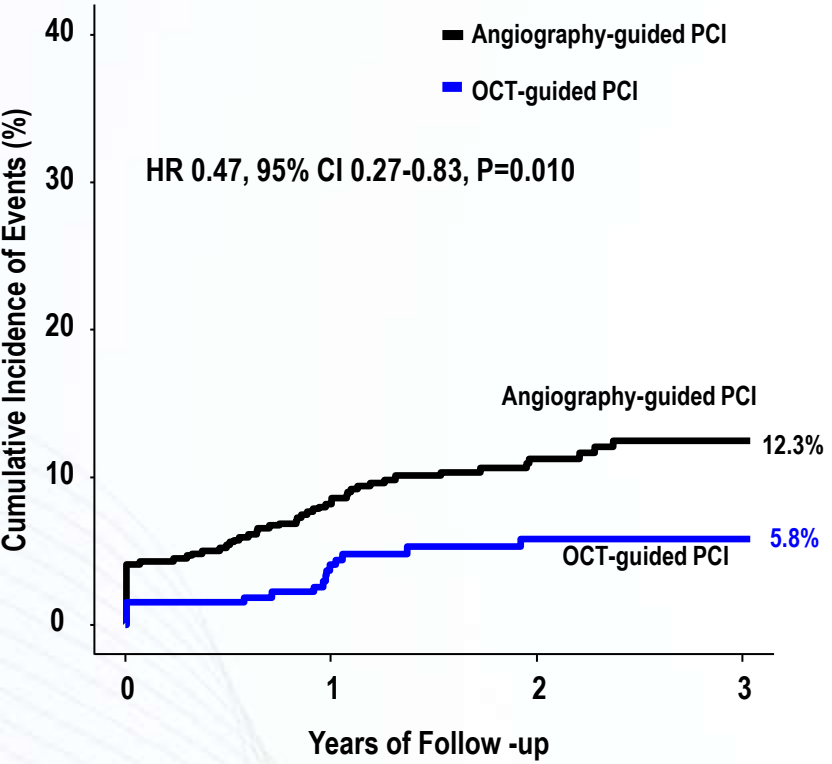
Prespecified Subgroup Analysis

Subgroup	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			
IVUS	59/800 (8.0%)	60/547 (12.3%)	0.66 (0.46-0.95)
OCT	15/278 (5.8%)	60/547 (12.3%)	0.47 (0.27-0.83)
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 years	36/517 (7.8%)	23/238 (10.6%)	0.72 (0.42-1.21)
≥65 years	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			
Presence	45/394 (12.9%)	26/223 (12.3%)	0.97 (0.60-1.57)
Absence	31/698 (4.7%)	34/324 (12.2%)	0.41 (0.25-0.67)
Chronic kidney disease			
Presence	22/203 (13.3%)	19/93 (23.3%)	0.51 (0.27-0.93)
Absence	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%)	0.72 (0.35-1.45)
≥50%	54/882 (6.7%)	48/463 (11.8%)	0.58 (0.39-0.85)



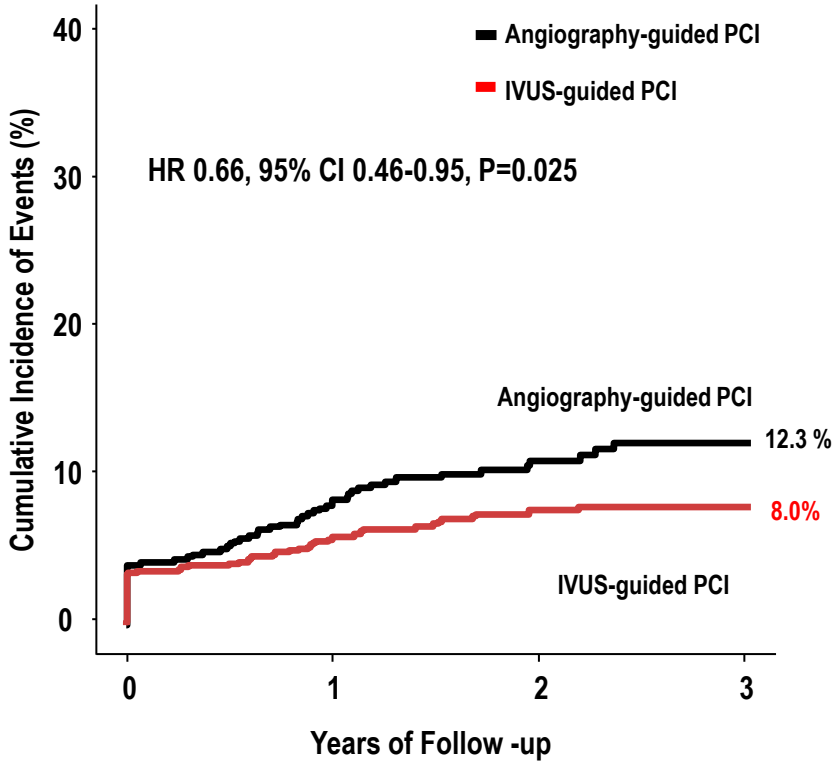
OCT-guided PCI vs. IVUS-guided PCI vs. Angiography-PCI

OCT-guided PCI vs. Angiography-guided PCI



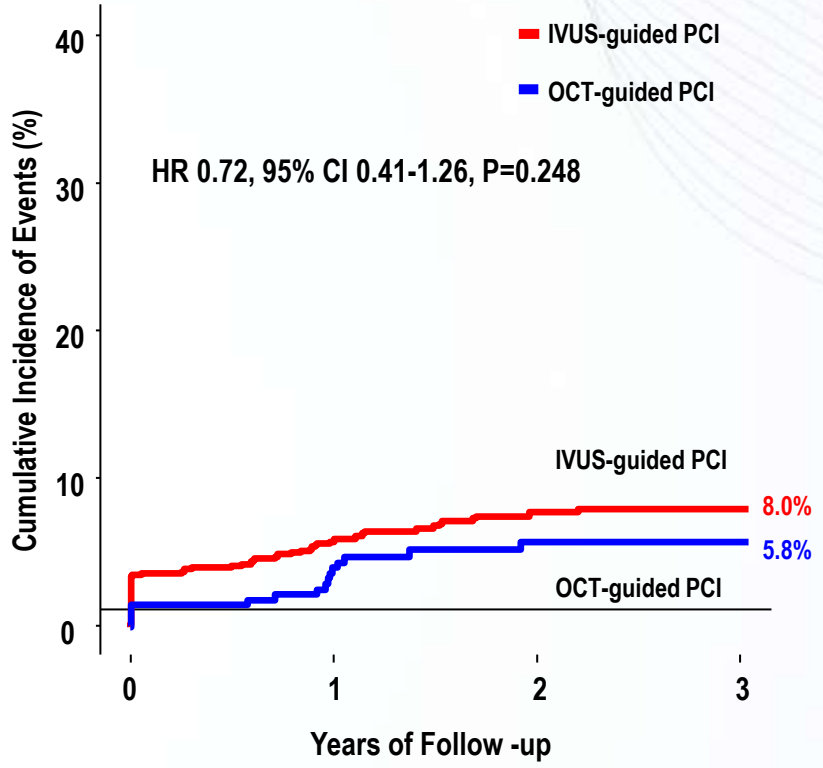
Number at risk				
Angiography-guided PCI	547	496	267	120
OCT-guided PCI	278	265	151	80

IVUS-guided PCI vs. Angiography-guided PCI



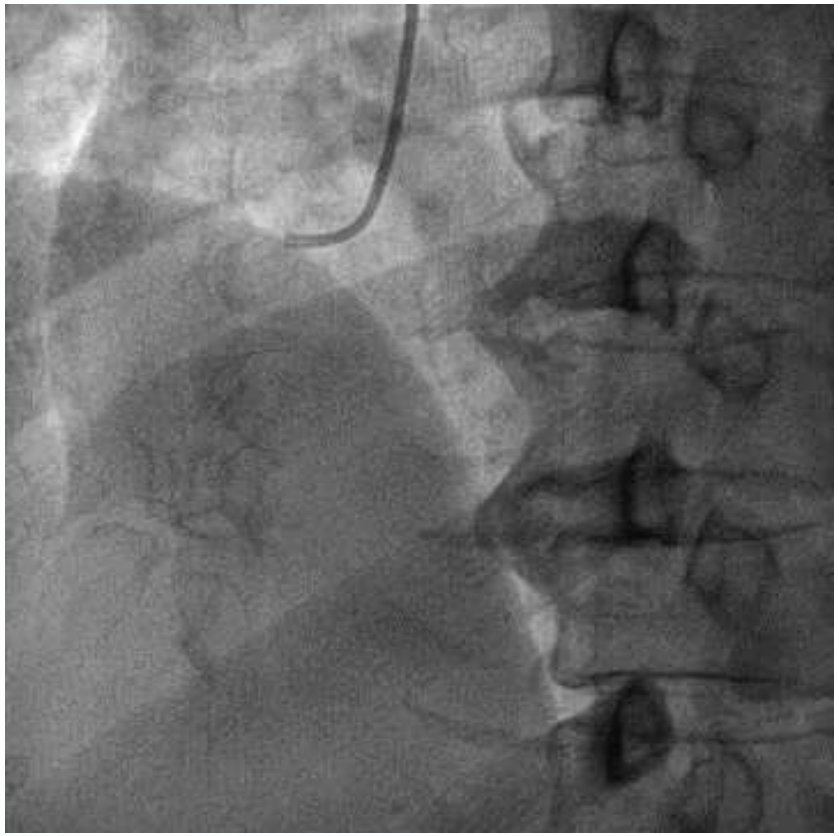
Number at risk				
Angiography-guided PCI	547	496	267	120
IVUS-guided PCI	800	745	409	172

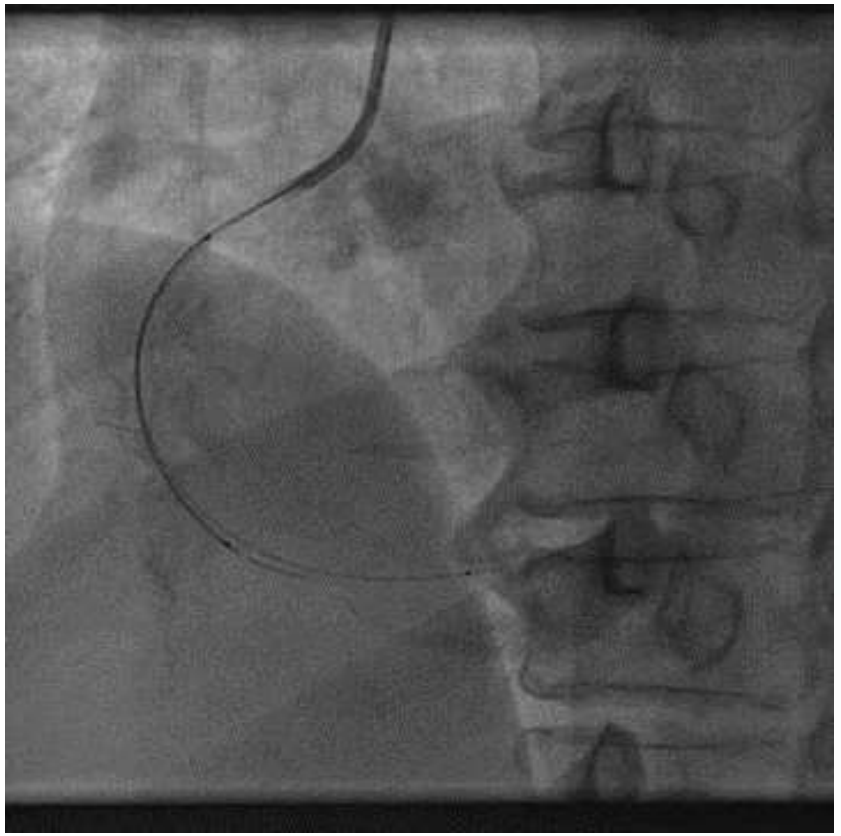
OCT-guided PCI vs. IVUS-guided PCI



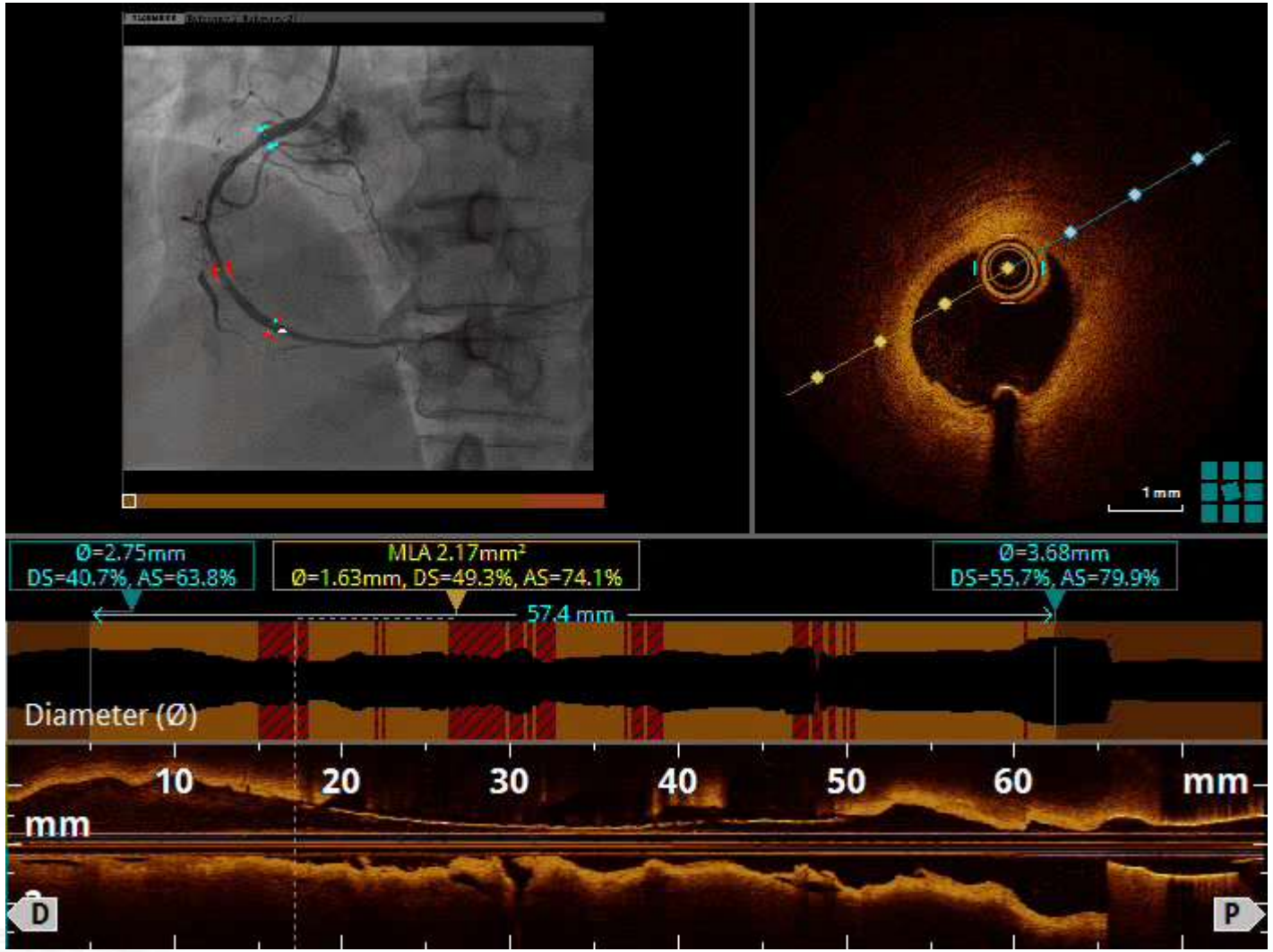
Number at risk				
IVUS-guided PCI	800	745	409	172
OCT-guided PCI	278	265	151	80

Case #1: Diffuse long lesion

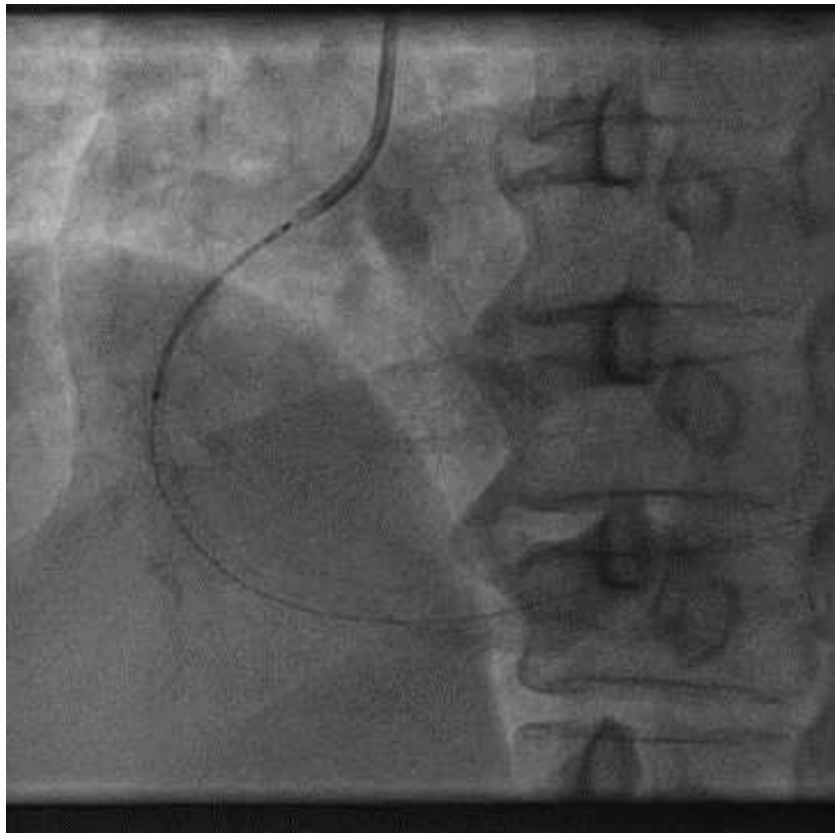


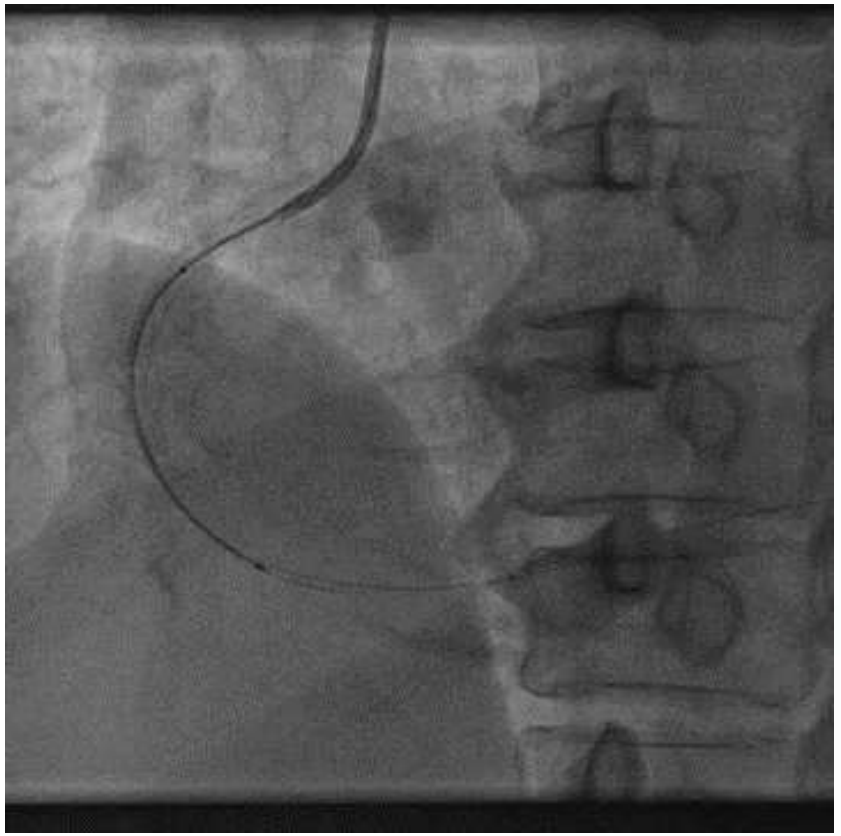


Pre-stenting OCT



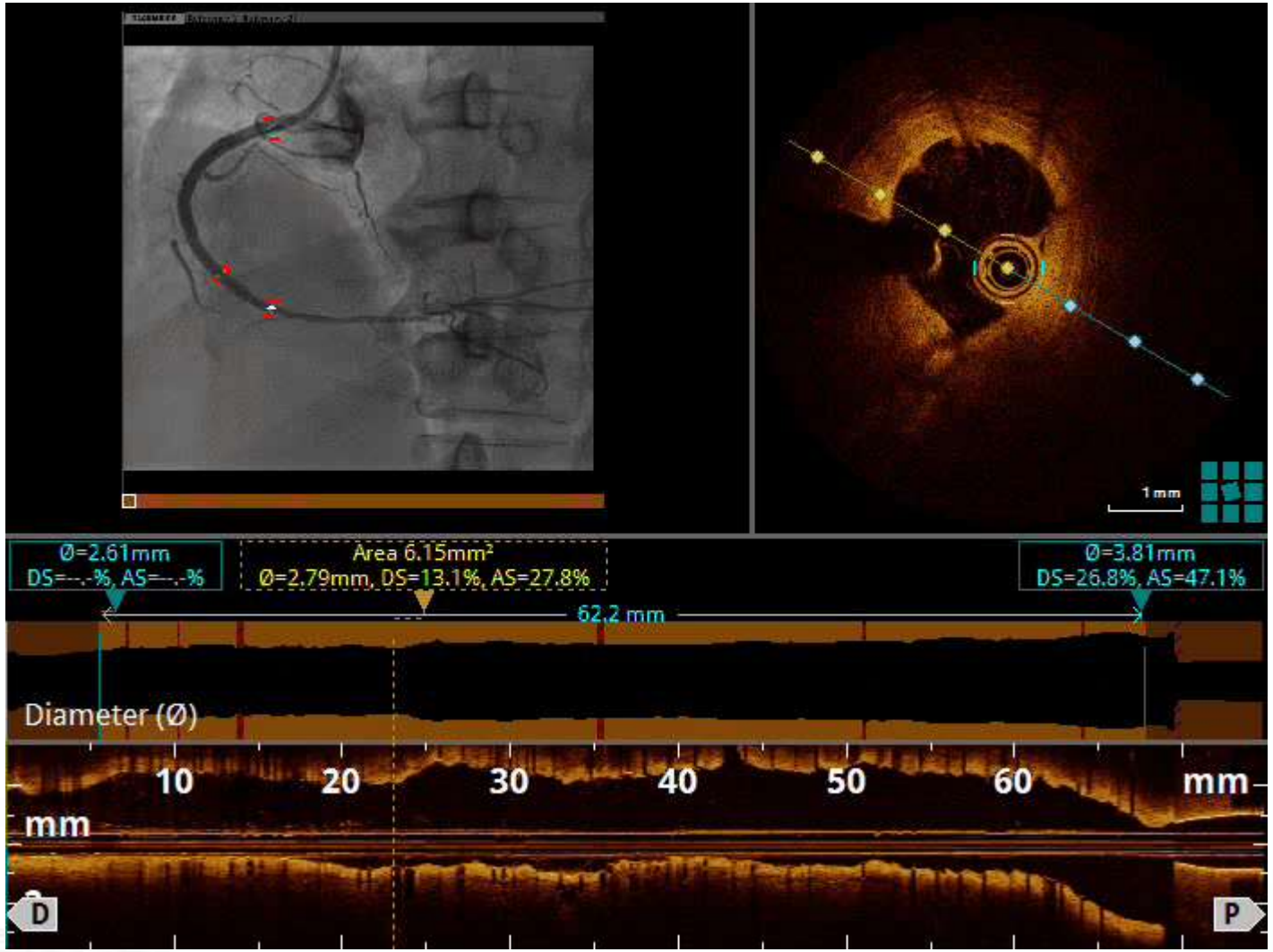
Stenting



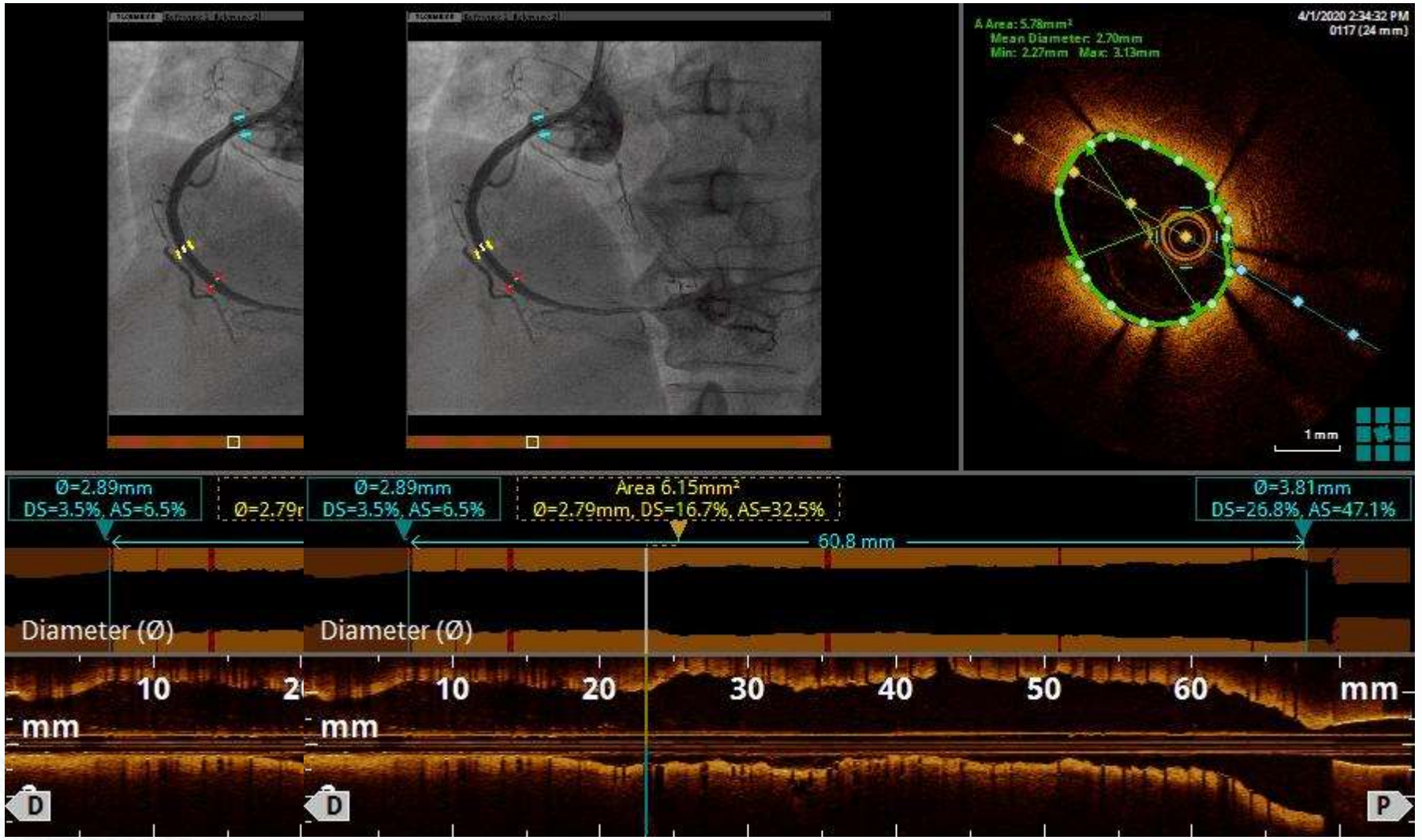


Xience Sierra 3.0*33 at m-dRCA
Xience Sierra 3.5*33 at p-mRCA

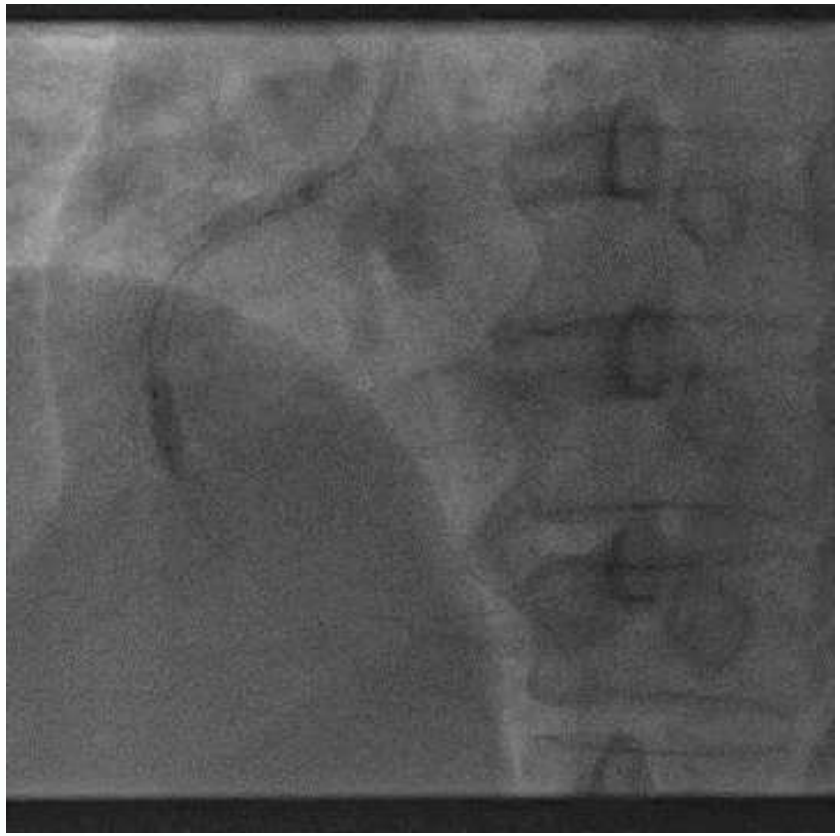
Post-stenting OCT

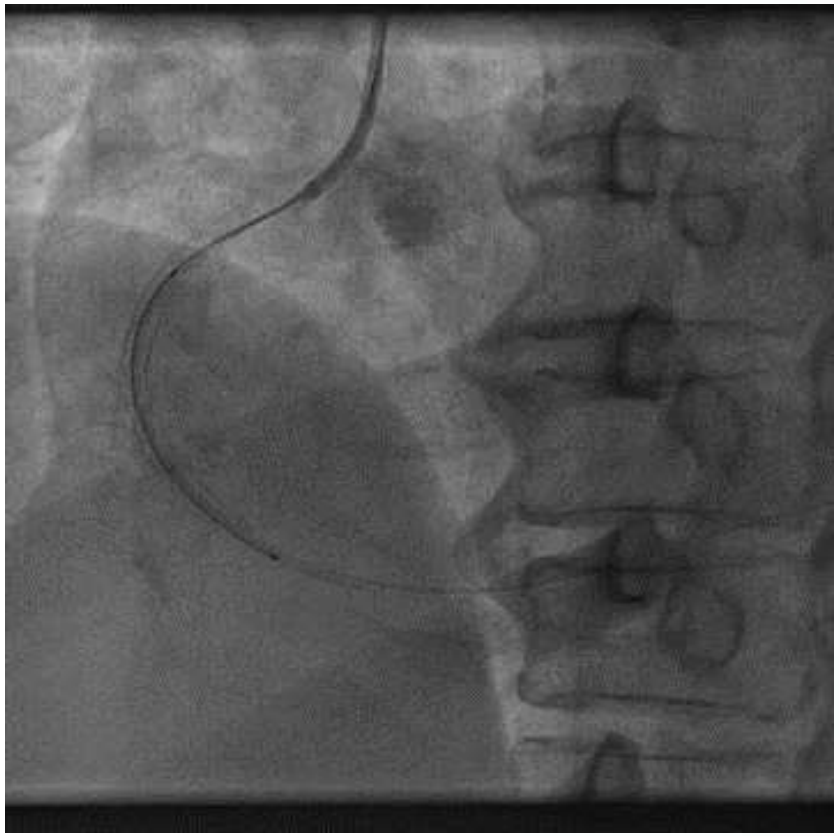


Confirmation of MSA



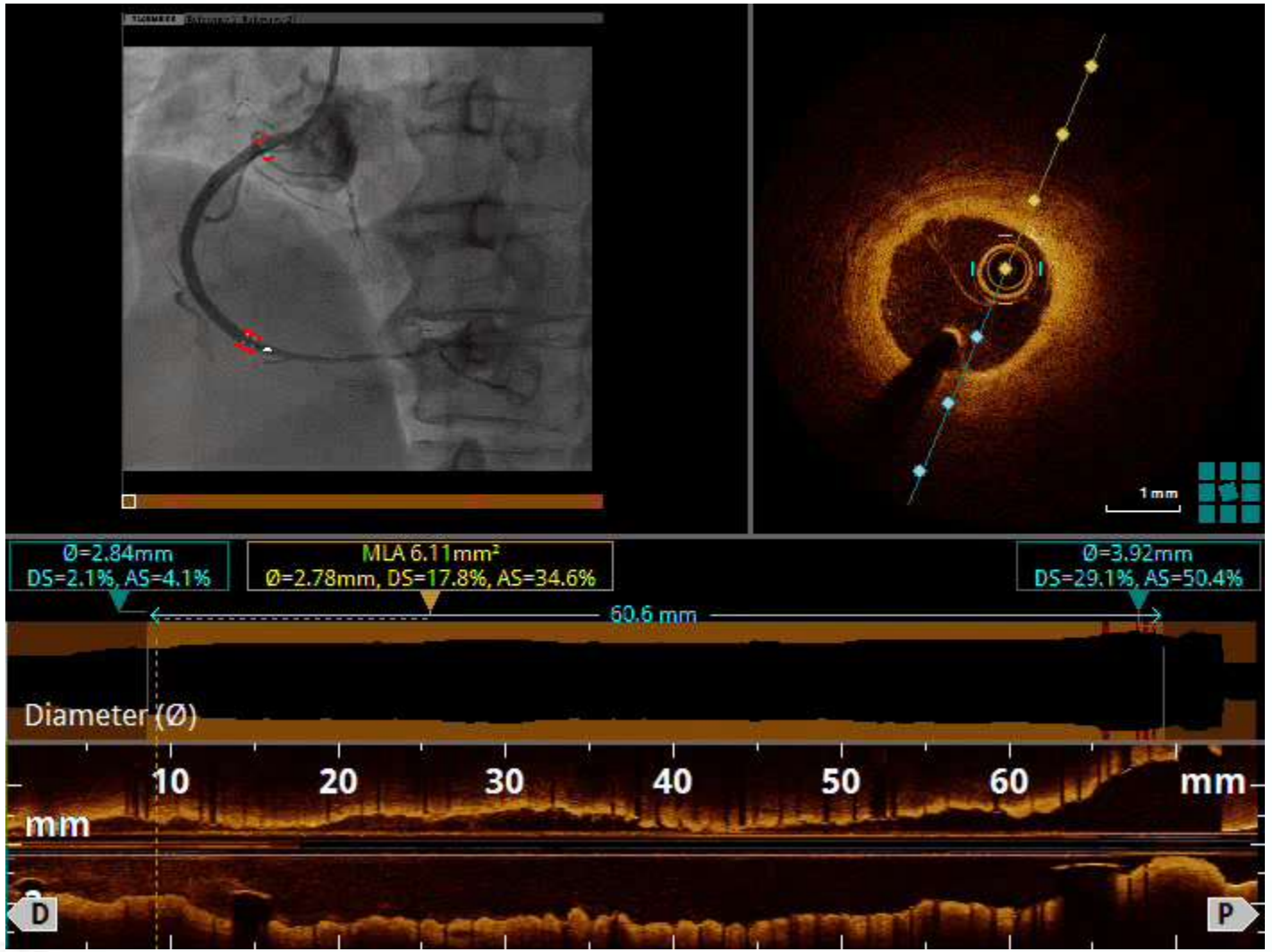
Postdilation



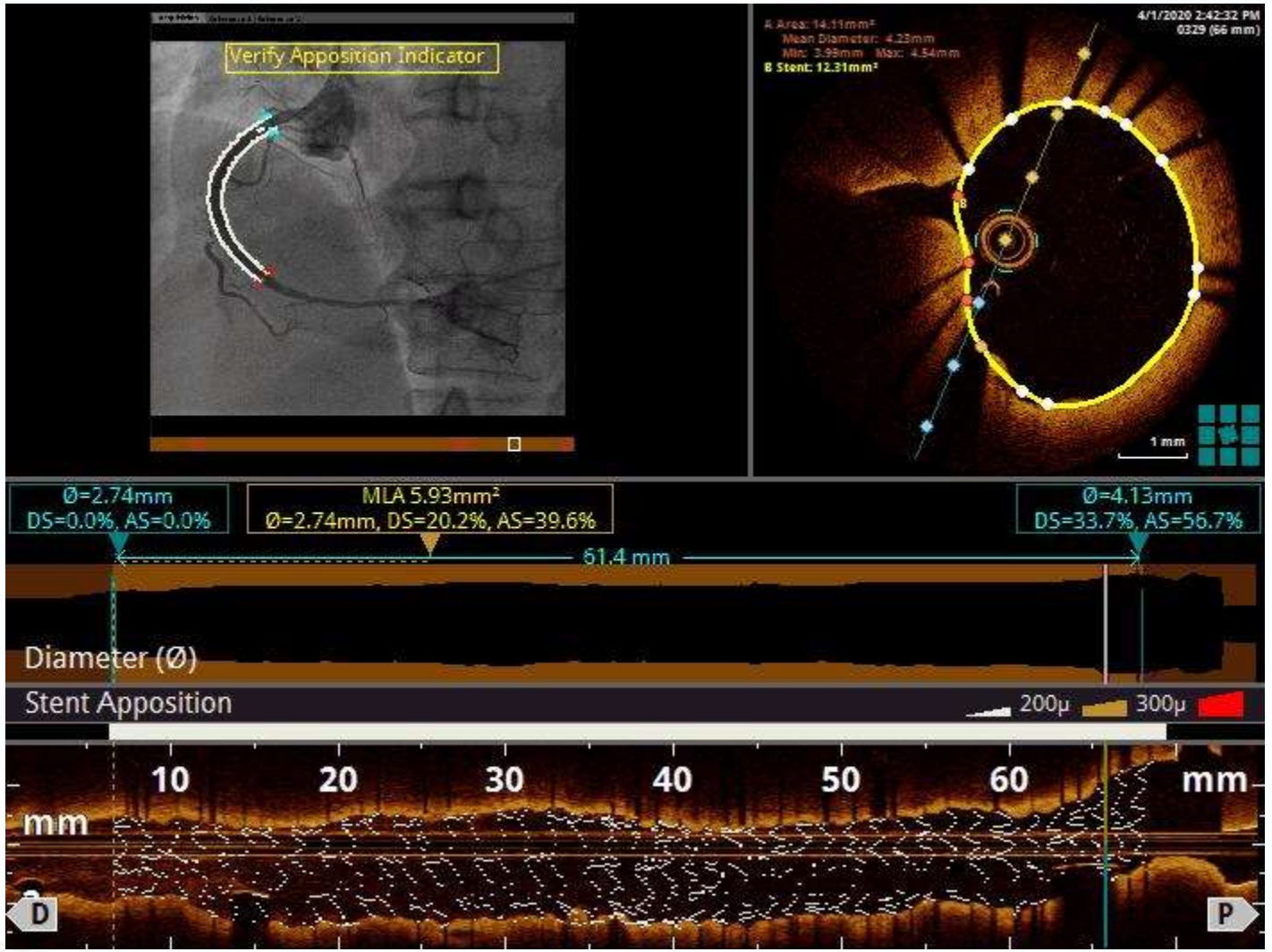


3.5*10 NC balloon

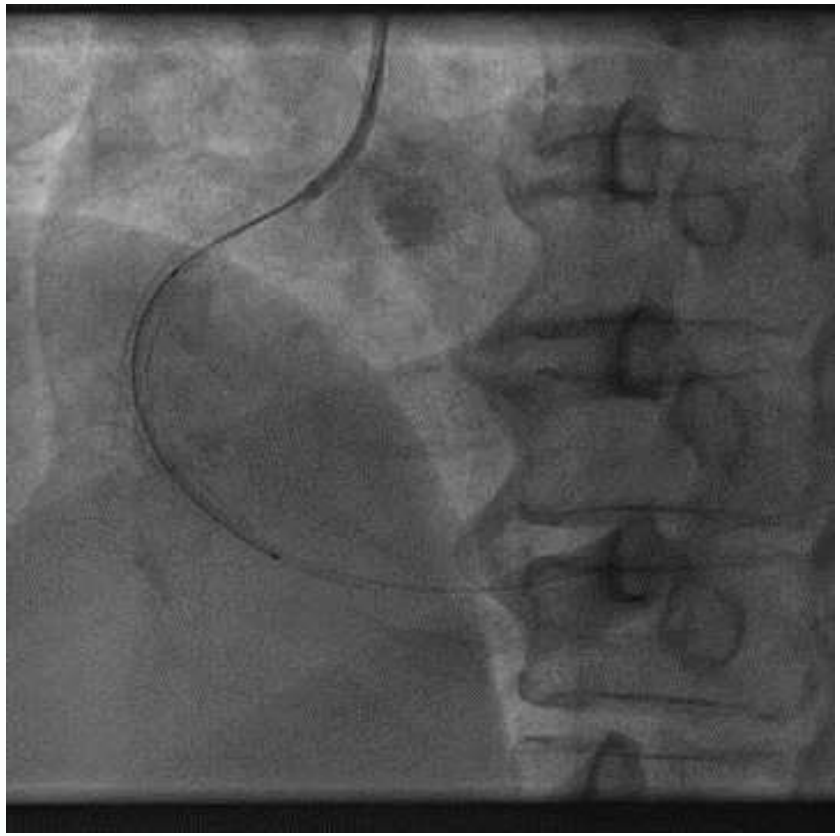
Final OCT


1 mm
Ø=2.84mm
DS=2.1%, AS=4.1%
MLA 6.11mm²
Ø=2.78mm, DS=17.8%, AS=34.6%
Ø=3.92mm
DS=29.1%, AS=50.4%
60.6 mm
Diameter (Ø)
10
20
30
40
50
60
mm
mm
D
P

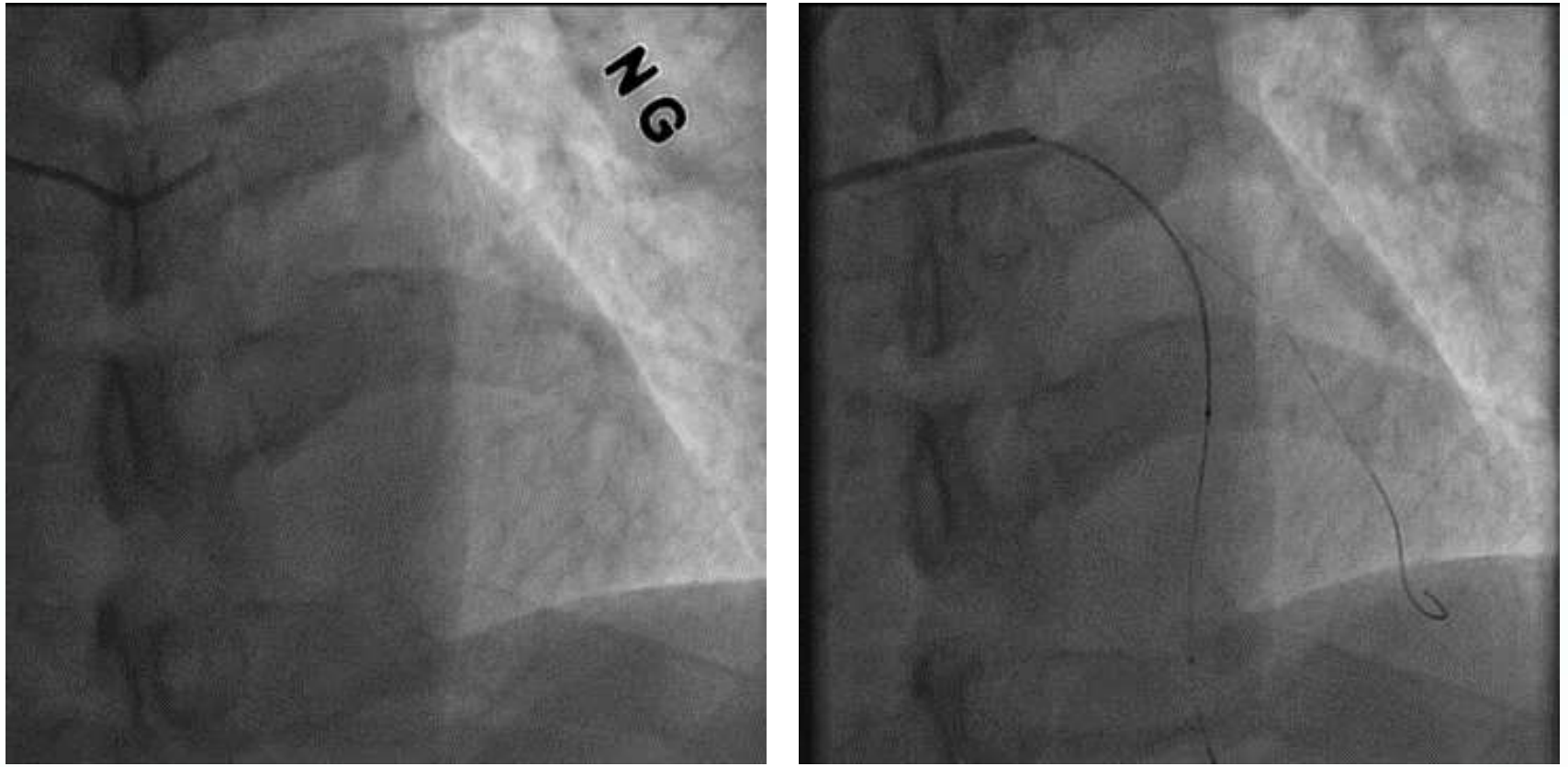
Final OCT: stent apposition



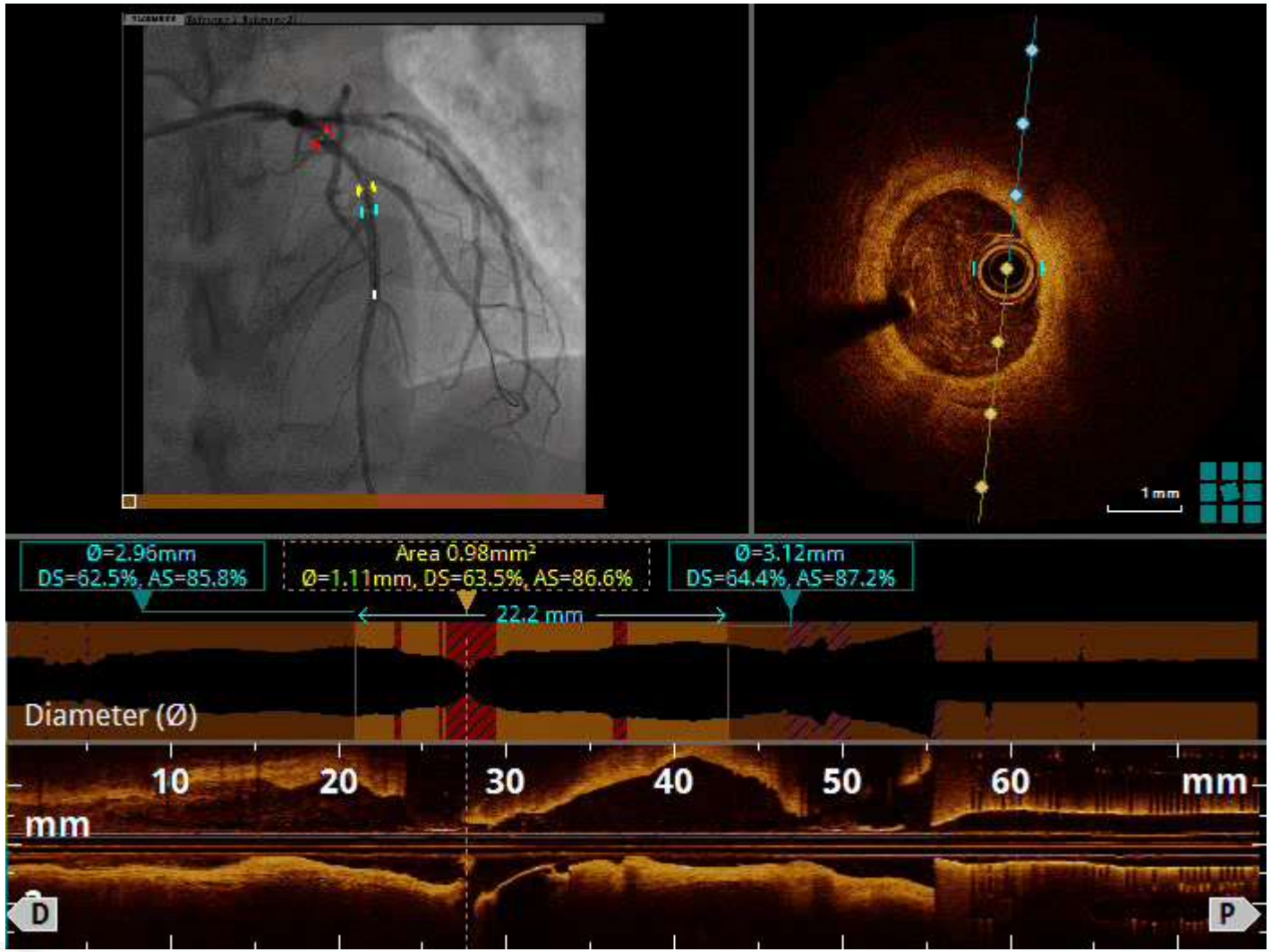
Final angiography



Case #2: Bifurcation lesion

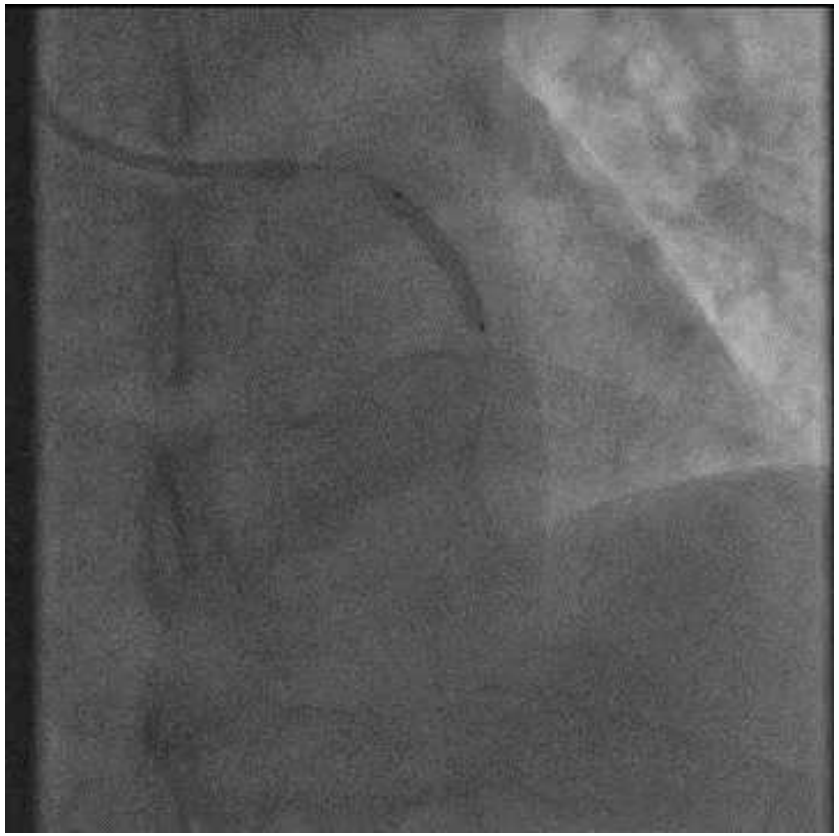


Pre-stenting OCT



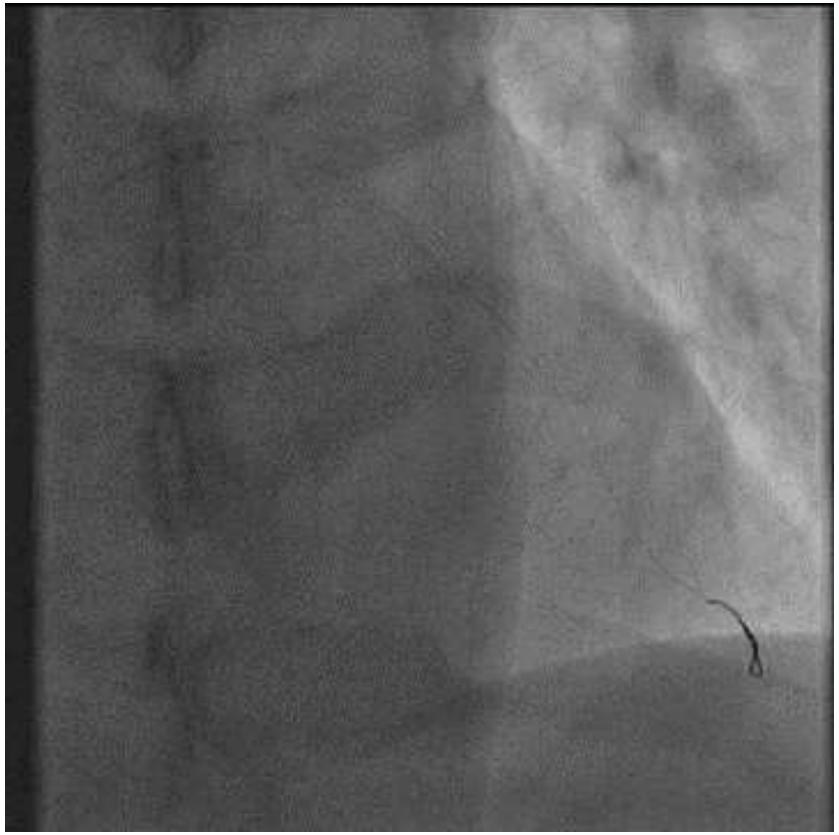
Mini-crush technique

Xience Sierra 2.75*18 at D1
Balloon crush

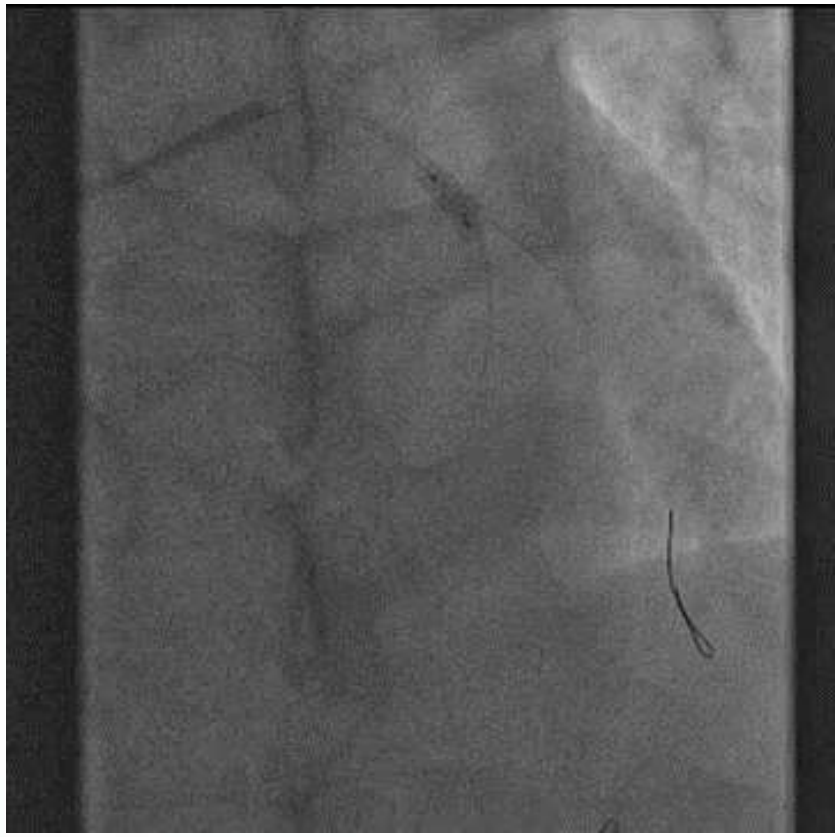


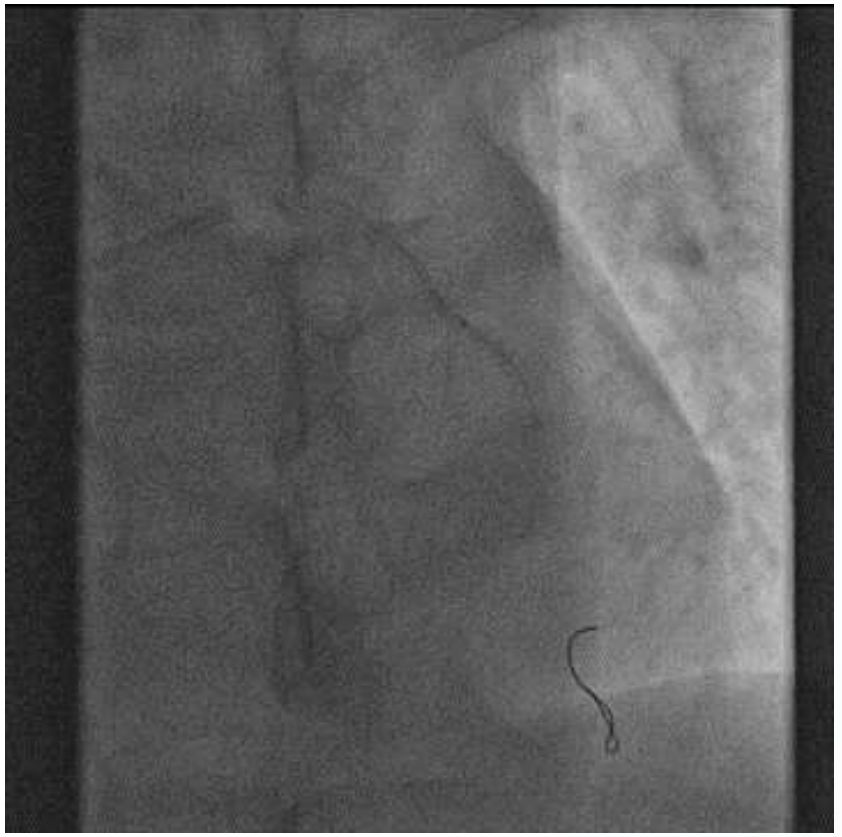
Xience Sierra 3.0*23 at pLAD

After stenting



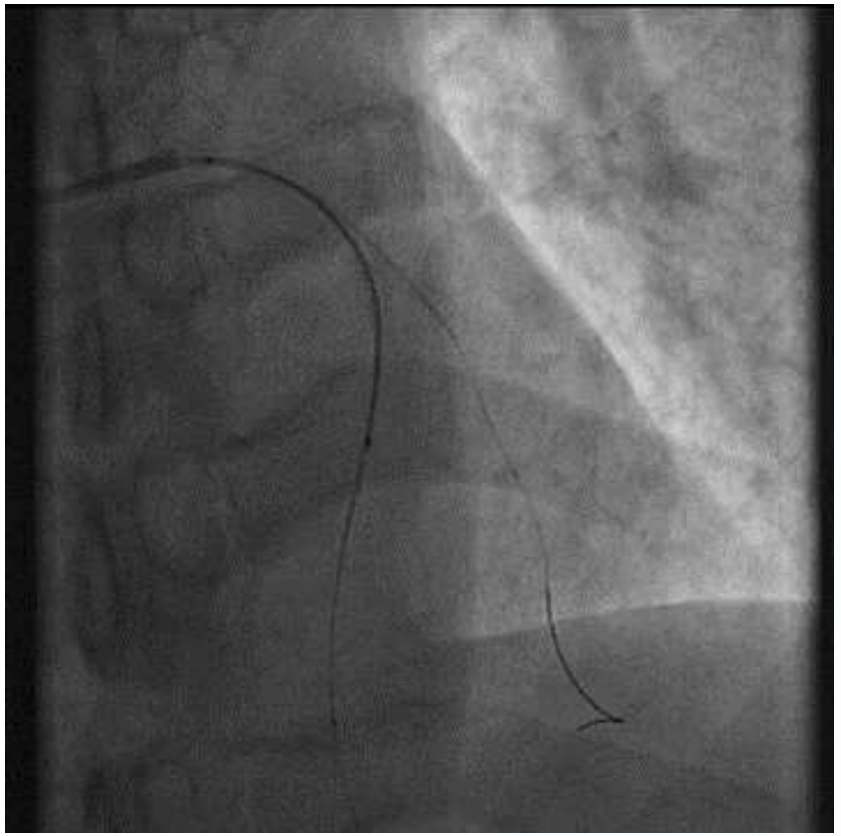
POT and small ballooning



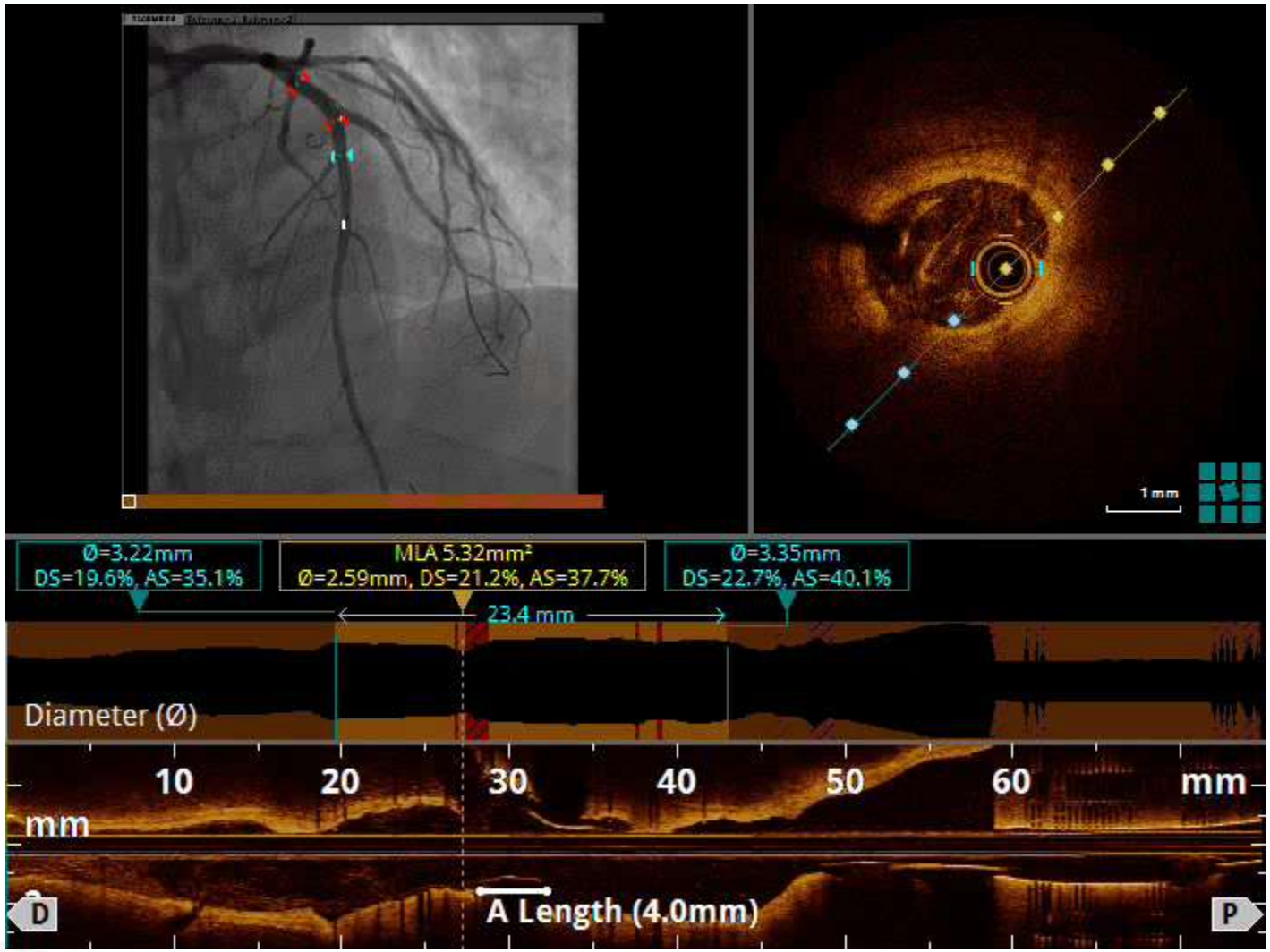


3.5*10 NC ballooning

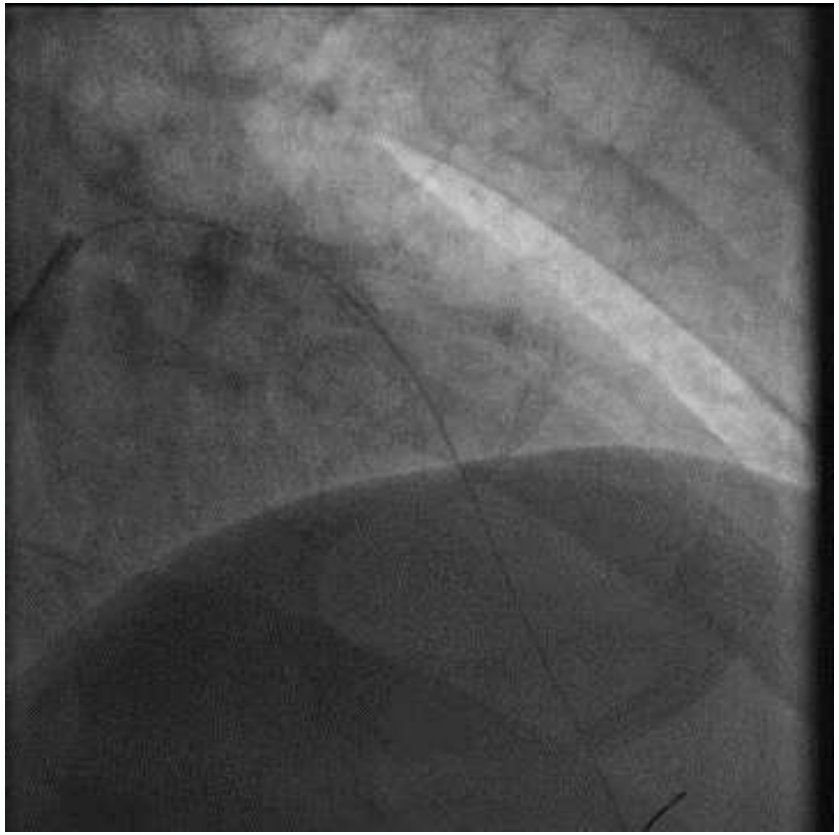
Final kissing ballooning

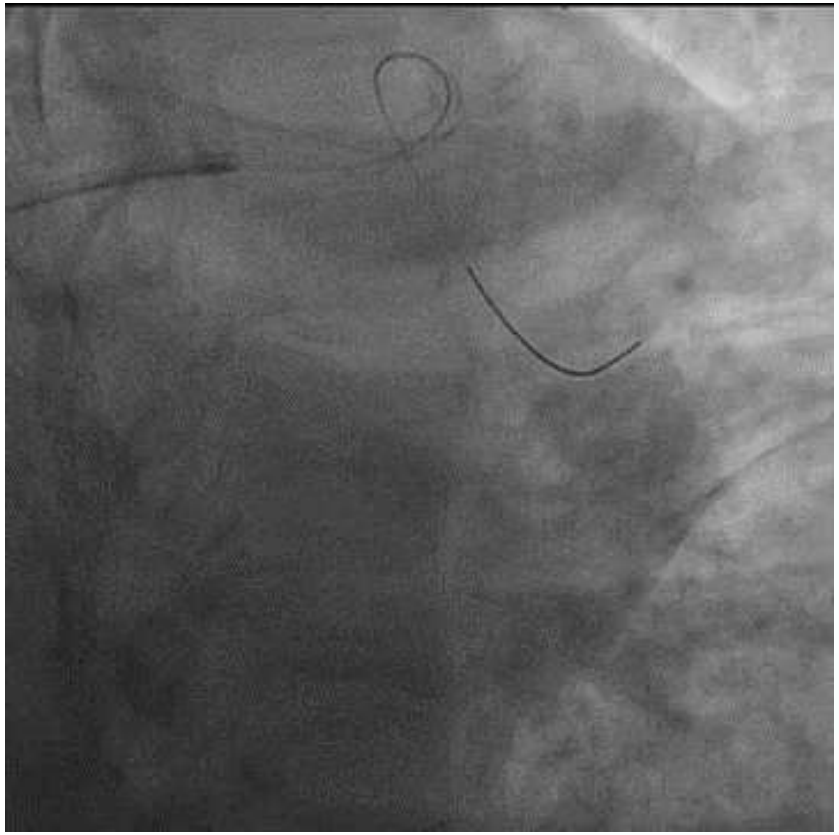


Post-PCI OCT


1 mm
Ø=3.22mm
DS=19.6%, AS=35.1%
MLA 5.32mm²
Ø=2.59mm, DS=21.2%, AS=37.7%
Ø=3.35mm
DS=22.7%, AS=40.1%
23.4 mm
Diameter (Ø)
10
20
30
40
50
60
mm
mm
D
A Length (4.0mm)
P

Final angiography





Summary

- Among patients with complex coronary artery lesions, OCT-guided PCI reduced a risk of TVF compared with angiography-guided PCI.
- OCT was comparable to IVUS in complex PCI
  - Numerically lower event rates with OCT
- OCT, compared with IVUS, has several advantages such as higher resolution, rapid pullback, and automatized analysis.