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ORIGINAL RESEARCH

Optical coherence tomography-guided percutaneous coronary intervention in acute coronary syndrome patients with complex lesions: a subgroup analysis of the randomised OCCUPI Trial

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ABSTRACT

BACKGROUND: The role of optical coherence tomography (OCT) guidance during percutaneous coronary intervention (PCI) in patients with acute coronary syndrome (ACS) remains inconclusive.

AIMS: This study aimed to evaluate the impact of OCT-guided PCI in ACS patients with complex lesions.

METHODS: The Optical CoherenCe Tomography-gUided Coronary Intervention in Patients With Complex Lesions (OCCUPI) Trial compared PCI with OCT guidance versus angiography guidance in patients who required drug-eluting stent implantation for complex lesions. This *post hoc* analysis focused on participants presenting with ACS. The primary outcome was 1-year major adverse cardiac events (a composite of cardiac death, myocardial infarction, stent thrombosis, or ischaemia-driven target vessel revascularisation).

RESULTS: Out of 1,604 randomised patients, 790 (49.3%) and 814 (50.7%) presented with ACS and chronic coronary syndrome (CCS), respectively. Among patients with ACS, the incidence of the primary outcome was 4.9% in the OCT-guided group and 9.5% in the angiography-guided group (hazard ratio [HR] 0.50, 95% confidence interval [CI]: 0.29-0.87; p=0.011). Among patients with CCS, its incidence was 4.4% and 5.4%, respectively (HR 0.80, 95% CI: 0.43-1.50; p=0.479). No significant interaction between clinical presentation and imaging guidance strategy was observed for the primary outcome ($p_{interaction}$=0.273). Among patients with ACS randomised to OCT guidance, the achievement of stent optimisation by OCT was associated with a lower incidence of the primary outcome compared with suboptimisation (2.9% vs 9.7%; HR 0.29, 95% CI: 0.12-0.72; p=0.004).

CONCLUSIONS: In ACS patients with complex lesions, OCT-guided PCI demonstrated an evident cardiovascular benefit over angiography-guided PCI, a finding endorsed by current guidelines. (ClinicalTrials.gov: NCT03625908)

KEYWORDS: acute coronary syndrome; optical coherence tomography; percutaneous coronary intervention

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Intravascular imaging guidance during percutaneous coronary intervention (PCI) is expected to improve clinical outcomes compared with angiography guidance, particularly in patients with complex lesions and those presenting with acute coronary syndrome (ACS)[1-7]. Timely revascularisation is the cornerstone of treatment for patients with ACS, with intravascular imaging guidance facilitating culprit lesion identification and optimising stent implantation[1,3,4,8]. Among intravascular imaging techniques, optical coherence tomography (OCT) provides more intuitive, higher-resolution images than intravascular ultrasound (IVUS)[1,8]. Nonetheless, while intravascular imaging guidance exclusively with IVUS has been investigated in patients with ACS, evidence supporting the impact of OCT guidance in patients with ACS remains insufficient[9-11].

Previous randomised trials have investigated the impact of PCI with OCT guidance versus angiography guidance in patients with complex lesions[12,13]. Although ACS and chronic coronary syndrome (CCS) differ in their underlying pathophysiology, plaque vulnerability, and the risk of future cardiovascular events, the role of OCT – particularly in patients with ACS – was left unexplored in these trials[2-4,8,12,13]. Recently, the Optical CoherenCe Tomography-gUided Coronary Intervention in Patients With Complex Lesions (OCCUPI) Trial has demonstrated the superiority of OCT guidance over angiography guidance with respect to 1-year major adverse cardiac events in patients requiring drug-eluting stent (DES) implantation for complex lesions[14]. Therefore, the present *post hoc* analysis of the OCCUPI Trial aimed to evaluate the impact of OCT guidance versus angiography guidance in patients undergoing PCI for complex lesions, particularly those with ACS.

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Impact on daily practice

The current *post hoc* analysis of the randomised OCCUPI Trial demonstrated that, in patients with acute coronary syndrome (ACS) requiring drug-eluting stent implantation for complex lesions, optical coherence tomography (OCT) guidance was associated with a significantly lower risk of 1-year major adverse cardiac events compared with angiography guidance, particularly in those who achieved stent optimisation by OCT. However, as these findings are based on a *post hoc* analysis, they should be considered hypothesis-generating. Dedicated randomised clinical trials with larger patient populations and longer follow-up are warranted to confirm the role of OCT in guiding percutaneous coronary intervention for ACS patients with complex lesions.

Methods

STUDY DESIGN AND PATIENT POPULATION

The study design and rationale of the OCCUPI Trial has been previously described in detail[14]. Briefly, the OCCUPI Trial was an investigator-initiated, multicentre, randomised, open-label, superiority trial that evaluated PCI with OCT guidance versus angiography guidance in 1,604 patients at 20 centres in South Korea[14]. Patients requiring PCI with DES implantation for complex lesions were eligible to participate in the trial[14]. Complex lesions were defined as acute myocardial infarction, long lesion, bifurcation lesion, small vessel disease, unprotected left main artery disease, in-stent restenosis, calcified lesion, intracoronary thrombus visible on angiography, chronic total occlusion, bypass graft lesion, or stent thrombosis[14]. The full inclusion and exclusion criteria are provided in **Supplementary Appendix 1**[14]. The trial was approved by the institutional review board of each participating centre and followed the ethical principles of the Declaration of Helsinki. Written informed consent was obtained from all patients prior to their enrolment. The present *post hoc* analysis evaluated the impact of OCT guidance during PCI for complex lesions according to clinical presentation, with a specific focus on patients with ACS. The diagnosis of ACS was determined by the investigators at the time of enrolment, primarily based on chest pain characteristics, cardiac biomarker levels, and electrocardiographic findings, in accordance with clinical guidelines and expert consensus[15,16].

RANDOMISATION AND TREATMENT

Consenting patients were randomly assigned to undergo PCI with OCT guidance (OCT-guided group) or angiography guidance without OCT (angiography-guided group) at a 1:1 ratio[14]. PCI was performed following the conventional standard methods using everolimus-eluting stents (XIENCE Alpine or XIENCE Sierra [both Abbott]). Detailed descriptions regarding OCT-guided and angiography-guided PCI are provided in the previous study and in **Supplementary Appendix 2**[14]. In patients assigned to the OCT-guided group, device sizing, landing, and stent optimisation were assessed under OCT guidance[14]. In the OCCUPI Trial, the OCT-defined stent optimisation criteria – comprising stent expansion, apposition, and edge dissection – were prespecified[14]. Achievement of stent optimisation by OCT was defined as meeting the following acceptability criteria for all three components (stent expansion, apposition, and edge dissection) on the final post-stent OCT evaluation[14]. Acceptable stent expansion was defined as meeting any of the following: minimal stent area ≥80% of the mean reference lumen area, ≥100% of the distal reference lumen area, or absolute minimal stent area >4.5 mm^2 (for a non-left main artery lesion). Acceptable stent apposition was indicated by acute malapposition with a distance of <400 µm. Acceptable edge dissection was defined as the absence of major dissection, which was characterised by the presence

Abbreviations

ACS	acute coronary syndrome	**DES**	drug-eluting stent	**PCI**	percutaneous coronary intervention
CCS	chronic coronary syndrome	**IVUS**	intravascular ultrasound		
DAPT	dual antiplatelet therapy	**OCT**	optical coherence tomography		

of any of the following: dissection flap circumference ≥60°, dissection length ≥3 mm, or deeper vessel injury (intramural haematoma, penetration into media or adventitia). In the OCT-guided group, patients who satisfied the prespecified stent optimisation criteria were further classified as the stent optimisation group, whereas those that did not were classified as the stent suboptimisation group[14]. In patients assigned to the angiography-guided group, device size was recommended to be determined based on quantitative angiographic assessment **(Supplementary Appendix 2)**[14].

STUDY OUTCOMES AND FOLLOW-UP

The primary outcome was 1-year major adverse cardiac events, defined as a composite of cardiac death, myocardial infarction, stent thrombosis, or ischaemia-driven target vessel revascularisation[14]. The secondary outcomes included the individual components of the primary outcome, as well as all-cause death, any revascularisation, stroke, bleeding, contrast-induced nephropathy, and stent optimisation, as confirmed on the final post-stent OCT evaluation[14]. As in the primary report of the OCCUPI Trial, *post hoc* composite outcomes included the composite of cardiac death, myocardial infarction, or stent thrombosis; the composite of cardiac death, spontaneous myocardial infarction, stent thrombosis, or ischaemia-driven target vessel revascularisation; and the composite of cardiac death, spontaneous myocardial infarction, or stent thrombosis[14]. Definitions of each clinical outcome are detailed in **Supplementary Appendix 3**[16-20]. All clinical outcomes were adjudicated by an independent clinical endpoint committee, which was blinded to the random assignments and primary results of the trial[14]. Clinical follow-up was performed at 1, 3, 6, and 12 months after PCI, and dual antiplatelet therapy (DAPT) was recommended for at least 6 months after PCI[14]. Guideline-directed medical therapy for the management of cardiovascular risk factors was strongly encouraged, irrespective of group assignment[14].

STATISTICAL ANALYSIS

The full statistical analysis plan of the OCCUPI Trial has been described previously[14]. All analyses were performed on an intention-to-treat basis. The cumulative incidence of the clinical outcomes was evaluated using a Kaplan-Meier survival analysis based on the time of enrolment to the occurrence of the first event of interest during follow-up. The event rates between the two groups were compared using log-rank tests. Hazard ratios (HRs) with 95% confidence intervals (CIs) were estimated using a Cox proportional hazard model. The interaction terms between clinical presentation (ACS vs CCS) and imaging guidance strategy (OCT guidance vs angiography guidance) for the primary, secondary, and *post hoc* composite outcomes were evaluated using formal interaction testing. Further details on statistical analyses are provided in **Supplementary Appendix 4**[14,21,22]. A two-sided p-value of <0.05 was considered significant for all tests, with no adjustment for multiple comparisons. All statistical analyses were performed using SPSS software, version 25.0 (IBM) and R software, version 4.2.2 (R Foundation for Statistical Computing).

Results

STUDY POPULATION AND BASELINE CHARACTERISTICS

Between January 2019 and September 2022, a total of 1,604 patients requiring PCI with DES implantation for complex lesions were enrolled in the OCCUPI Trial. Among them, 790 (49.3%) and 814 (50.7%) presented with ACS and CCS, respectively **(Figure 1)**. Among patients with ACS, 327 (41.4%) had acute myocardial infarction.

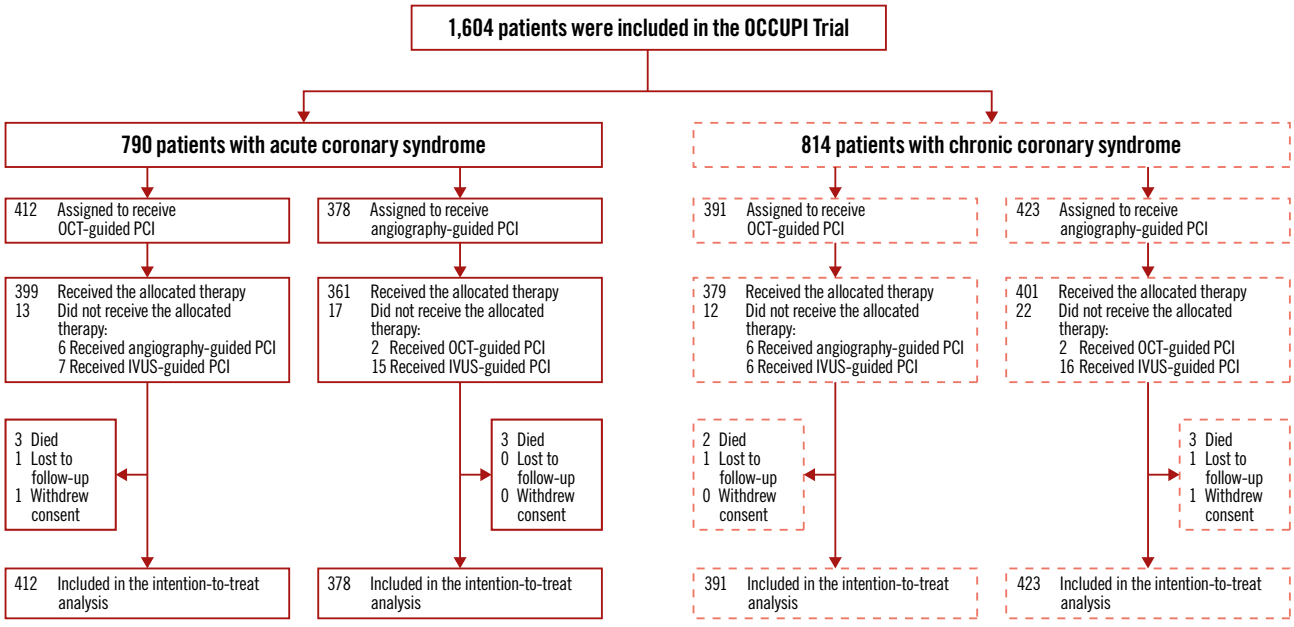


Figure 1. *Study flow of participants. IVUS: intravascular ultrasound; OCT: optical coherence tomography; PCI: percutaneous coronary intervention*

Baseline characteristics according to clinical presentation are presented in **Table 1**. Patients with ACS were younger, exhibited a higher body mass index, and included a higher proportion of current smokers than patients with CCS. Additionally, patients with ACS were more likely to be discharged with potent $P2Y_{12}$ inhibitors and were also found to have lower proportions of hypertension, dyslipidaemia, and prior PCI, as well as a lower left ventricular ejection fraction. The baseline characteristics between the OCT-guided and angiography-guided groups were well balanced in both patients with ACS and those with CCS, except for body mass index and left ventricular ejection fraction in patients with CCS **(Supplementary Table 1)**.

LESION AND PROCEDURAL CHARACTERISTICS

Lesion and procedural characteristics according to clinical presentation are presented in **Table 2**. Patients with ACS showed a higher proportion of target lesions with intracoronary thrombus and lower proportions of long lesions and bifurcation lesions than those with CCS. During PCI, patients with ACS had a lower number of stents implanted, less frequent use of adjunct post-dilation, a smaller amount of contrast volume, and a shorter procedural time. Quantitative coronary angiographic analyses revealed that patients with ACS had a larger postprocedural minimal lumen diameter and smaller diameter stenosis, although the preprocedural minimal lumen diameter and diameter stenosis did not differ between patients with ACS and those with CCS.

The lesion characteristics between the OCT-guided and angiography-guided groups were well balanced in both patients with ACS and those with CCS **(Supplementary Table 2)**. During PCI, the OCT-guided group had a larger stent diameter, more frequent use of high-pressure post-dilation, and a higher maximal inflation pressure than the angiography-guided group, irrespective of clinical presentation. However, the amount of contrast volume used and the procedural time were greater in the OCT-guided group, in both patients with ACS and those with CCS. While the preprocedural minimal lumen diameter and diameter stenosis did not differ between the OCT-guided and angiography-guided groups, the

Table 1. Baseline characteristics according to clinical presentation.

	Total population (N=1,604)	ACS patients (N=790)	CCS patients (N=814)	*p*-value
Age, years	64 (57-70)	63 (56-70)	65 (59-71)	0.001
Sex				0.075
Female	314 (19.6)	140 (17.7)	174 (21.4)	
Male	1,290 (80.4)	650 (82.3)	640 (78.6)	
Body mass index, kg/m^2	24.7 (22.9-26.6)	25.0 (23.2-26.9)	24.4 (22.8-26.3)	<0.001
Hypertension	917 (57.2)	428 (54.2)	489 (60.1)	0.020
Diabetes mellitus	523 (32.6)	252 (31.9)	271 (33.3)	0.588
Chronic kidney disease[a]	110 (6.9)	59 (7.5)	51 (6.3)	0.393
Dyslipidaemia	1,345 (83.9)	647 (81.9)	698 (85.7)	0.043
Current smoker	307 (19.1)	208 (26.3)	99 (12.2)	<0.001
Prior myocardial infarction	82 (5.1)	37 (4.7)	45 (5.5)	0.513
Prior percutaneous coronary intervention	330 (20.6)	143 (18.1)	187 (23.0)	0.019
Prior coronary bypass graft surgery	24 (1.5)	13 (1.6)	11 (1.4)	0.780
Prior stroke	84 (5.2)	44 (5.6)	40 (4.9)	0.633
Clinical presentation				<0.001
CCS	814 (50.7)	-	814 (100)	
Unstable angina	463 (28.9)	463 (58.6)	-	
Non-ST-segment elevation myocardial infarction	223 (13.9)	223 (28.2)	-	
ST-segment elevation myocardial infarction	104 (6.5)	104 (13.2)	-	
Multivessel coronary artery disease	416 (25.9)	211 (26.7)	205 (25.2)	0.522
Left ventricular ejection fraction, %	59.0 (57.3-65.3)	59.0 (54.0-65.0)	59.0 (58.0-66.0)	<0.001
Antiplatelet therapy at discharge				
Aspirin	1,571 (97.9)	774 (98.0)	797 (97.9)	1.000
$P2Y_{12}$ inhibitor				
Any	1,582 (98.6)	779 (98.6)	803 (98.6)	1.000
Clopidogrel	1,232 (76.8)	481 (60.9)	751 (92.3)	<0.001
Potent $P2Y_{12}$ inhibitor[b]	350 (21.8)	298 (37.7)	52 (6.4)	<0.001

Data are median (interquartile range), or number (%). [a]Chronic kidney disease was defined as an estimated glomerular filtration rate of <60 mL/min/1.73 m^2 of body surface area. [b]Potent $P2Y_{12}$ inhibitor indicates ticagrelor or prasugrel. ACS: acute coronary syndrome; CCS: chronic coronary syndrome

Table 2. Lesion and procedural characteristics according to clinical presentation.

	Total population (N=1,604)	ACS patients (N=790)	CCS patients (N=814)	*p*-value
Complex lesion characteristics[a]				
Acute myocardial infarction	327 (20.4)	327 (41.4)	-	-
Long lesion[b]	1,152 (71.8)	519 (65.7)	633 (77.8)	<0.001
Bifurcation lesion	381 (23.8)	165 (20.9)	216 (26.5)	0.009
Small vessel disease[c]	267 (16.6)	138 (17.5)	129 (15.8)	0.421
Unprotected left main artery disease	229 (14.3)	101 (12.8)	128 (15.7)	0.107
In-stent restenosis	171 (10.7)	78 (9.9)	93 (11.4)	0.355
Calcified lesion[d]	149 (9.3)	66 (8.4)	83 (10.2)	0.236
Intracoronary thrombus visible on angiography	130 (8.1)	113 (14.3)	17 (2.1)	<0.001
Chronic total occlusion	115 (7.2)	61 (7.7)	54 (6.6)	0.455
Bypass graft lesion	3 (0.2)	1 (0.1)	2 (0.2)	1.000
Stent thrombosis	1 (0.1)	1 (0.1)	0 (0)	0.493
Procedural characteristics[e]				
Total number of treated complex lesions	1,894	944	950	-
Number of stents implanted per patient	1 (1-2)	1 (1-2)	1 (1-2)	0.049
Stent diameter, mm	3.1 (3.0-3.5)	3.0 (3.0-3.5)	3.1 (3.0-3.5)	0.895
Total stent length, mm	37.0 (28.9-53.2)	36.1 (28.8-54.2)	37.5 (29.2-51.1)	0.959
Adjunct post-dilation	1,808 (95.5)	883 (93.5)	925 (97.4)	<0.001
High-pressure post-dilation	1,048 (55.3)	508 (53.8)	540 (56.8)	0.201
Maximal inflation pressure, atmosphere	16.0 (14.0-18.0)	16.0 (14.0-18.0)	16.0 (14.0-18.0)	0.755
Contrast volume used per patient, mL	250 (200-330)	220 (200-310)	250 (200-350)	<0.001
Procedural time per patient, min	49.0 (34.0-65.0)	47.0 (34.0-61.0)	50.0 (33.5-69.0)	0.024
Quantitative coronary angiographic analyses[e]				
Preprocedural reference vessel diameter, mm	2.81 (2.52-3.12)	2.80 (2.53-3.12)	2.83 (2.51-3.11)	0.954
Preprocedural minimal lumen diameter, mm	0.70 (0.46-0.94)	0.70 (0.45-0.95)	0.70 (0.48-0.92)	0.897
Preprocedural diameter stenosis, %	75.0 (67.2-83.3)	75.1 (66.4-84.0)	74.9 (68.0-82.8)	0.799
Lesion length, mm	32.1 (24.3-48.4)	31.1 (24.1-50.1)	32.6 (24.7-47.0)	0.978
Postprocedural minimal lumen diameter, mm	2.67 (2.42-2.98)	2.69 (2.44-3.02)	2.65 (2.39-2.94)	0.007
Postprocedural diameter stenosis, %	13.0 (8.6-18.0)	12.5 (7.9-18.0)	14.0 (9.0-18.0)	0.002

Data are median (interquartile range), n, or n (%). [a]Patients may have had more than one qualifying characteristic for complex lesions. [b]A long lesion was defined as a lesion requiring a stent length ≥28 mm. [c]Small vessel disease was defined as a lesion w with a ith reference vessel diameter <2.5 mm. [d]A calcified lesion was defined as a lesion with severe calcification, showing radiopacities without cardiac motion before contrast injection, usually affecting both sides of the arterial lumen. [e]Procedural characteristics and quantitative coronary angiographic analyses data are per-lesion analyses, unless stated otherwise. ACS: acute coronary syndrome; CCS: chronic coronary syndrome

OCT-guided group exhibited a larger postprocedural minimal lumen diameter and smaller diameter stenosis than the angiography-guided group, regardless of clinical presentation.

CLINICAL OUTCOMES

Patients were followed up for a median of 365 days (interquartile range [IQR] 365-365 days). The primary outcome occurred in 56 patients (7.1%) among those with ACS and in 40 patients (4.9%) among those with CCS (HR 1.46, 95% CI: 0.97-2.18; p=0.067). During follow-up, DAPT was maintained for a median of 6 months (IQR 6-12 months), with details on its duration according to clinical presentation and complex lesion characteristics presented in **Supplementary Table 3**.

The primary outcome according to clinical presentation and randomised imaging guidance strategy is presented in **Table 3**. Among patients with ACS, the incidence of the primary outcome was 4.9% in the OCT-guided group and 9.5% in the angiography-guided group (HR 0.50, 95% CI: 0.29-0.87; p=0.011) **(Figure 2)**. Among patients with CCS, the incidence of the primary outcome was 4.4% in the OCT-guided group and 5.4% in the angiography-guided group (HR 0.80, 95% CI: 0.43-1.50; p=0.479) **(Supplementary Figure 1)**. No significant interaction between clinical presentation and imaging guidance strategy was observed for the primary outcome ($p_{interaction}$=0.273).

The secondary and *post hoc* composite outcomes are presented in **Table 3**. With respect to the individual components of the primary outcome, the incidence of myocardial infarction was lower in the OCT-guided group than in the angiography-guided group among patients with ACS. The incidence of cardiac death and ischaemia-driven

Table 3. Clinical outcomes according to clinical presentation and randomised imaging guidance strategy.

	ACS patients (N=790)				CCS patients (N=814)				$p_{interaction}$ [a]
	OCT-guided (N=412)	Angiography-guided (N=378)	HR (95% CI)	*p*-value	OCT-guided (N=391)	Angiography-guided (N=423)	HR (95% CI)	*p*-value	
Primary outcome									
Major adverse cardiac events (composite of cardiac death, myocardial infarction, stent thrombosis, or ischaemia-driven target vessel revascularisation)	20 (4.9)	36 (9.5)	0.50 (0.29-0.87)	0.011	17 (4.4)	23 (5.4)	0.80 (0.43-1.50)	0.479	0.273
Secondary outcomes									
All-cause death	3 (0.7)	3 (0.8)	0.92 (0.19-4.54)	0.915	2 (0.5)	3 (0.7)	0.72 (0.12-4.31)	0.718	0.844
Cardiac death	0 (0)	3 (0.8)	-	0.071	1 (0.3)	2 (0.5)	0.54 (0.05-5.96)	0.610	-
Myocardial infarction	15 (3.6)	26 (6.9)	0.53 (0.28-0.99)	0.041	14 (3.6)	14 (3.3)	1.09 (0.52-2.28)	0.828	0.144
Spontaneous myocardial infarction	4 (1.0)	8 (2.1)	0.46 (0.14-1.51)	0.188	3 (0.8)	11 (2.6)	0.29 (0.08-1.04)	0.058	0.616
Target vessel related	3	6			2	11			
Non-target vessel related	1	2			1	0			
Periprocedural myocardial infarction	11 (2.7)	18 (4.8)	0.56 (0.26-1.18)	0.119	11 (2.8)	4 (0.9)	2.98 (0.95-9.36)	0.061	0.016
Stent thrombosis	3 (0.7)	4 (1.1)	0.69 (0.15-3.06)	0.619	1 (0.3)	6 (1.4)	0.18 (0.02-1.49)	0.072	0.310
Definite	1	3			1	1			
Probable	2	1			0	5			
Ischaemia-driven target vessel revascularisation	8 (1.9)	15 (4.0)	0.49 (0.21-1.14)	0.091	4 (1.0)	18 (4.3)	0.24 (0.08-0.70)	0.004	0.303
Target lesion revascularisation	6	12			3	16			
Non-target lesion revascularisation	2	3			1	2			
Any revascularisation	9 (2.2)	21 (5.6)	0.39 (0.18-0.84)	0.013	10 (2.6)	25 (5.6)	0.42 (0.20-0.88)	0.017	0.874
Stroke	1 (0.2)	2 (0.5)	0.46 (0.04-5.06)	0.514	0 (0)	3 (0.7)	-	0.095	-
Bleeding (BARC Type 3 or 5)	3 (0.7)	2 (0.5)	1.38 (0.23-2.26)	0.723	1 (0.3)	3 (0.7)	0.36 (0.04-3.45)	0.354	0.361
Contrast-induced nephropathy	5 (1.2)	4 (1.1)	1.15 (0.31-4.27)	0.838	5 (1.3)	3 (0.7)	1.80 (0.43-7.55)	0.412	0.648
Achievement of stent optimisation by OCT[b]	279/393 (71.0)				266/374 (71.1)				
***Post hoc* composite outcomes[c]**									
Cardiac death, myocardial infarction, or stent thrombosis	15 (3.6)	27 (7.1)	0.51 (0.27-0.95)	0.029	15 (3.8)	15 (3.5)	1.09 (0.53-2.22)	0.822	0.115
Cardiac death, spontaneous myocardial infarction, stent thrombosis, or ischaemia-driven target vessel revascularisation	9 (2.2)	18 (4.8)	0.46 (0.20-1.00)	0.047	6 (1.5)	20 (4.7)	0.32 (0.13-0.79)	0.009	0.559
Cardiac death, spontaneous myocardial infarction, or stent thrombosis	4 (1.0)	8 (2.1)	0.46 (0.14-1.51)	0.188	4 (1.0)	12 (2.8)	0.36 (0.12-1.10)	0.061	0.769

Data are number (% of the cumulative rates at 1 year according to Kaplan-Meier event rates), unless stated otherwise. [a]P-value for the interaction between clinical presentation and imaging guidance strategy. [b]Data are the number of patients/total number of patients (%). Stent optimisation was defined as acceptable stent expansion, apposition, and edge dissection, and was assessed in the OCT-guided group with available final post-stent OCT evaluation, which included 393 patients with ACS and 374 patients with CCS. [c]Analysed as *post hoc* endpoints in the OCCUPI Trial. ACS: acute coronary syndrome; BARC: Bleeding Academic Research Consortium; CCS: chronic coronary syndrome; CI: confidence interval; HR: hazard ratio; OCCUPI: Optical CoherenCe Tomography-gUided Coronary Intervention in Patients With Complex Lesions; OCT: optical coherence tomography

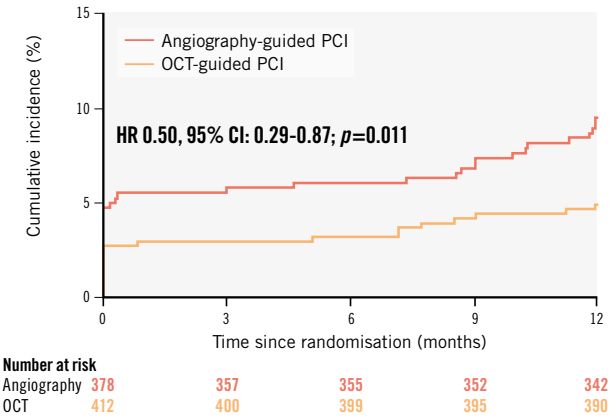


Figure 2. *Time-to-event curves for the primary outcome according to randomised imaging guidance strategy among patients with ACS. Kaplan-Meier survival curves for the primary outcome (major adverse cardiac events, defined as a composite of cardiac death, myocardial infarction, stent thrombosis, or ischaemia-driven target vessel revascularisation) according to randomised imaging guidance strategy among patients with ACS. ACS: acute coronary syndrome; CI: confidence interval; HR: hazard ratio; OCT: optical coherence tomography; PCI: percutaneous coronary intervention*

target vessel revascularisation showed a trend towards being lower in the OCT-guided group. The incidence of stent thrombosis did not differ between the two groups. As for the other secondary and *post hoc* composite outcomes, compared with the angiography-guided group, the OCT-guided group showed a lower incidence of any revascularisation; composite of cardiac death, myocardial infarction, or stent thrombosis; and composite of cardiac death, spontaneous myocardial infarction, stent thrombosis, or ischaemia-driven target vessel revascularisation. No difference in the incidence of contrast-induced nephropathy was noted between the two groups. No significant interactions between clinical presentation and imaging guidance strategy were observed for the secondary and *post hoc* composite outcomes, except for periprocedural myocardial infarction.

The subgroup analysis according to the ACS type is presented in **Supplementary Table 4**. No significant interactions between the ACS type and imaging guidance strategy were observed for the study outcomes. Among patients with ACS, sensitivity analyses for the primary outcome showed consistent results in those meeting multiple complex lesion criteria defined in the trial (496 [62.8%]) or alternative criteria (392 [49.6%]) **(Supplementary Figure 2)**.

STENT OPTIMISATION BY OCT

Out of 803 patients assigned to the OCT-guided group in the trial, 767 (393 with ACS and 374 with CCS) had final post-stent OCT available for stent optimisation evaluation. Among patients with ACS, 279 (71.0%) satisfied the prespecified stent optimisation criteria by OCT. ACS patients with stent optimisation showed a lower incidence of the primary outcome than those with stent suboptimisation (2.9% vs 9.7%; HR 0.29, 95% CI: 0.12-0.72; p=0.004) **(Figure 3, Supplementary Table 5)**. CCS patients with stent optimisation showed a trend towards a lower incidence of the primary outcome compared with those with stent suboptimisation **(Supplementary Figure 3, Supplementary Table 5)**.

Among patients with ACS, a smaller stent diameter and lower maximal inflation pressure were identified as independent determinants of stent suboptimisation following OCT-guided PCI, whereas among patients with CCS, a long lesion, smaller stent diameter, and smaller reference vessel diameter were identified as independent determinants **(Supplementary Table 6)**.

Discussion

The main findings of this *post hoc* analysis of the OCCUPI Trial, which investigated the impact of OCT guidance versus angiography guidance with a particular focus on ACS patients, were as follows **(Central illustration)**: (1) among patients with ACS requiring DES implantation for complex lesions, the risk of 1-year major adverse cardiac events – defined as a composite of cardiac death, myocardial infarction, stent thrombosis, or ischaemia-driven target vessel revascularisation – was significantly lower in the OCT-guided group than in the angiography-guided group; (2) among ACS patients with OCT guidance, the achievement of the prespecified stent optimisation criteria by OCT was associated with a significantly lower risk of major adverse cardiac events; and (3) the advantage of OCT guidance and achieving stent optimisation in reducing the risk of major adverse cardiac events was especially evident in patients with ACS, although no significant interaction between clinical presentation and imaging guidance strategy was observed for major adverse cardiac events. Overall, our findings support the use of OCT to guide PCI in ACS patients with complex lesions.

The latest guidelines strongly recommend intravascular imaging guidance for patients undergoing PCI for complex lesions[2,3]. Moreover, patients with ACS are expected to derive substantial benefits from intravascular imaging during PCI[1,6,7]. In the previous multicentre registry study and meta-analysis, the benefit of IVUS guidance in reducing major adverse cardiac events was particularly evident in patients with ACS[6,7]. Additionally, the recent Intravascular ultrasound-guided versus angiography-guided percutaneous coronary intervention in acute coronary syndromes (IVUS-ACS) trial, which exclusively enrolled patients with ACS, confirmed the benefit of IVUS-guided PCI in reducing target vessel failure, defined as a 1-year composite of cardiac death, target vessel myocardial infarction, or clinically driven target vessel revascularisation[9]. However, whether OCT-guided PCI could reduce the risk of cardiovascular events in patients with ACS has not been sufficiently evaluated. The Optical Coherence Tomography Guided Percutaneous Coronary Intervention With Nobori Stent Implantation in Patients With Non ST Segment Elevation Myocardial Infarction (OCTACS) and Does Optical Coherence Tomography Optimise Results of Stenting (DOCTORS) trials explored the role of OCT guidance in patients with non-ST-segment elevation myocardial infarction; however, both trials enrolled only a small number of patients (100 and 240 patients, respectively) and defined the

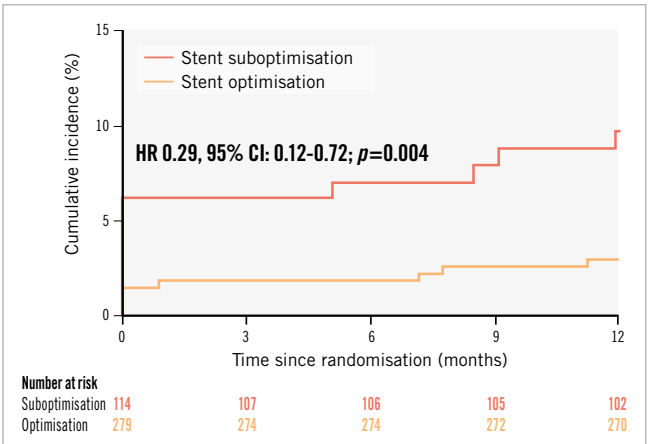


Figure 3. *Time-to-event curves for the primary outcome. Kaplan-Meier survival curves for the primary outcome according to stent optimisation among patients with ACS assigned to OCT guidance. Patients with stent optimisation were defined as those with acceptable stent expansion, apposition, and edge dissection on the final post-stent OCT evaluation. ACS: acute coronary syndrome; CI: confidence interval; HR: hazard ratio; OCT: optical coherence tomography*

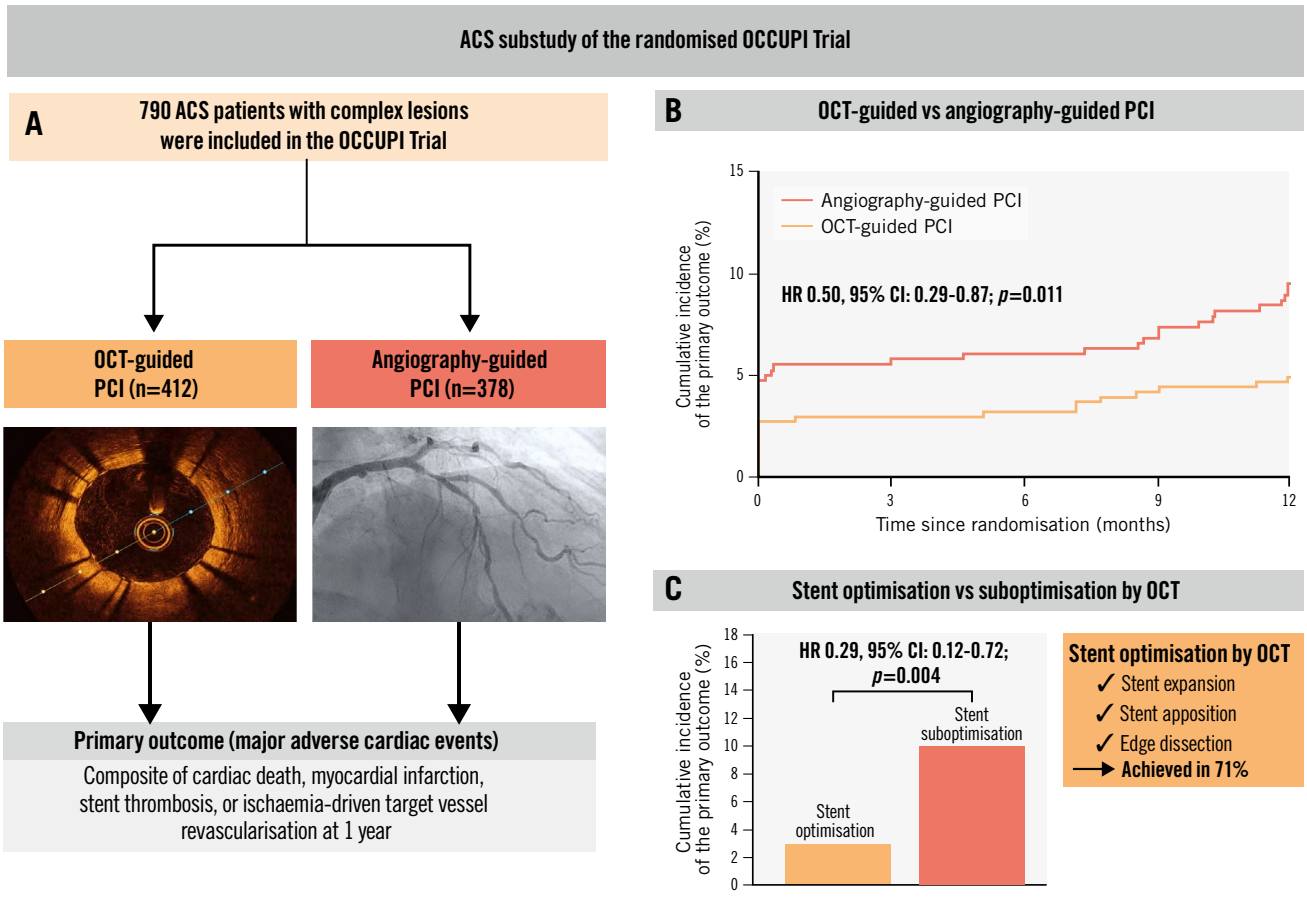
procedural endpoints (strut coverage and post-PCI fractional flow reserve, respectively) as the primary outcome[10,11]. In contrast, the current study focused on the ACS subgroup in the OCCUPI Trial; it included 790 patients with all ACS types (i.e., unstable angina, non-ST-segment elevation myocardial infarction, and ST-segment elevation myocardial infarction) and conducted clinical follow-up for up to 1 year. Among enrolled patients with ACS, the primary outcome of 1-year major adverse cardiac events occurred less frequently in the OCT-guided group than in the angiography-guided group. Moreover, while no significant interaction between clinical presentation and imaging guidance strategy was observed, the advantage of OCT guidance in reducing the risk of major adverse cardiac events was especially evident in patients with ACS. These observations align with previous evidence regarding the use of intravascular imaging in patients with ACS and may support current recommendations for OCT guidance in patients with ACS undergoing PCI for complex lesions[1,3,6-8]. Presumably, the exceptional advantages of high-resolution OCT in identifying the culprit lesions, detecting thrombus, and delineating luminal discontinuity and plaque composition in patients with ACS may have contributed to these substantial benefits[1,3,4,8,23]. As observed in this study, it may be hypothesised that the higher incidence of myocardial infarction in the angiography-guided group, compared with the OCT-guided group, reflects missed culprit lesions. Nevertheless, further studies are required before any causative effect can be established or rebutted.

In this study, OCT guidance was associated with a significant 50% relative reduction in the risk of 1-year major adverse cardiac events, compared with angiography guidance, in patients with ACS undergoing PCI for complex lesions; this was mainly driven by the reduction in myocardial infarction and target vessel revascularisation. Our findings are consistent with the primary results of the OCCUPI Trial and similar to those of the IVUS-ACS trial, which evaluated the role of IVUS guidance in patients with ACS[9,14]. Regarding contrast-induced nephropathy after PCI, despite the greater contrast volume and longer procedural time in the OCT-guided group, as noted in previous trials, the incidence was similar between the OCT-guided and angiography-guided groups, regardless of clinical presentation[12,13]. Meanwhile, a significant interaction between clinical presentation and OCT guidance strategy was observed for periprocedural myocardial infarction. Given that the proportion of patients who achieved stent optimisation by OCT was similar between those with ACS and those with CCS (71%), the higher prevalence of long and bifurcation lesions, along with the longer procedural time of OCT-guided PCI in patients with CCS than in those with ACS, may have contributed to our findings regarding periprocedural myocardial infarction. These factors are known to increase the risk, likely owing to the more aggressive procedures required to meet the prespecified stent optimisation criteria[24,25]. Additional studies considering clinical presentation and OCT guidance are needed to investigate the impact of potential periprocedural myocardial infarction during the process of stent optimisation on long-term cardiovascular events.

Although previous trials have consistently reported improved clinical outcomes with stent optimisation guided by intravascular imaging in complex lesions, the impact of stent optimisation by OCT in patients with ACS has not been thoroughly evaluated[5,9,26]. In the subgroup analysis of the Randomized Controlled Trial of Intravascular Imaging Guidance Versus Angiography-Guidance on Clinical Outcomes After Complex Percutaneous Coronary Intervention (RENOVATE-COMPLEX-PCI), achieving stent optimisation resulted in a reduced risk of target vessel failure, particularly in patients with ACS[27]. However, in their study, IVUS guidance was mainly evaluated, whereas OCT was used in only 25% of patients[5,27]. In the OCCUPI Trial, OCT was exclusively used as the intravascular imaging modality, and achieving stent optimisation according to the prespecified, protocol-defined OCT criteria was associated with a lower risk of major adverse cardiac events compared with suboptimisation[14]. Moreover, the current subgroup analysis showed that the advantage of achieving stent optimisation by OCT in reducing the risk of major adverse cardiac events was especially evident in patients with ACS. The three key parameters of OCT-defined stent optimisation – stent expansion, apposition, and edge dissection – are important OCT predictors of cardiovascular events after PCI. These parameters may have a greater influence on patients with ACS than on those with CCS because of their vulnerable features, such as increased thrombogenicity[8,27-29]. Furthermore, given that additional post-stent procedures required for stent optimisation are particularly challenging in the ACS setting because of concerns regarding potential complications such as no-reflow or distal embolisation, the pre- and post-stent OCT assessments may have facilitated a more effective and safer application of adjunctive high-pressure post-dilation or additional stenting[1,8,30]. However, achieving stent optimisation was demanding, and meticulous OCT-based decision-making regarding procedural strategy, including stent diameter and

EuroIntervention Central Illustration

Optical coherence tomography guidance during percutaneous coronary intervention in acute coronary syndrome patients with complex lesions.



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The impact of OCT guidance versus angiography guidance during PCI for complex lesions in patients presenting with ACS in the OCCUPI Trial. Achievement of stent optimisation by OCT was prespecified based on stent expansion, apposition, and edge dissection. A) Study details; (B) incidence of the primary outcome according to imaging guidance strategy (OCT vs angiography); (C) incidence of the primary outcome according to whether patients achieved stent optimisation or not. ACS: acute coronary syndrome; CI: confidence interval; HR: hazard ratio; OCT: optical coherence tomography; PCI: percutaneous coronary intervention

inflation pressure, may improve the likelihood of successful optimisation in patients with ACS. Furthermore, to gain a deeper understanding of stent optimisation, additional studies are warranted to explore the impact of more extensive optimisation on clinical outcomes.

Limitations

This study has some limitations. First, as this study was a *post hoc* subgroup analysis of a randomised clinical trial based on clinical presentation, potential selection bias should be considered. In addition, the number of patients in each clinical presentation may have limited the statistical power to derive definite conclusions regarding the impact of OCT-guided PCI. Second, comparing each component of the primary outcome might be difficult because of the small number of events; therefore, the results should be interpreted with caution. Third, the OCCUPI Trial was an open-label trial in which physicians were not blinded to treatment allocation. However, an independent clinical endpoint committee that was blinded to treatment assignments adjudicated all clinical outcomes in the trial. Fourth, the trial's criteria for defining complex lesions are arbitrary and may limit the generalisability of the findings. Fifth, specific guidance on optimisation criteria – especially concerning clinical presentation – was not established in the trial. Sixth, this study lacked detailed qualitative assessment of OCT images, including the evaluation of calcified plaque. Seventh, the follow-up period in this study was relatively short, lasting just 1 year. Our findings should therefore be

considered only as hypothesis-generating, which underscores the need for future clinical trials with a larger number of patients and a longer follow-up period.

Conclusions

This *post hoc* analysis focusing on ACS patients in the OCCUPI Trial demonstrated the evident cardiovascular benefit of OCT guidance over angiography guidance in reducing the risk of a 1-year composite of cardiac death, myocardial infarction, stent thrombosis, or ischaemia-driven target vessel revascularisation. Such benefit was particularly observed in patients who achieved stent optimisation by OCT. Our findings support the use of OCT as an effective intravascular imaging technique to guide PCI in ACS patients with complex lesions, in line with current guidelines. Given that this was a *post hoc* analysis of a randomised trial, the findings should be interpreted as hypothesis-generating and warrant confirmation in future dedicated trials conducted for each clinical presentation.

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Conflict of interest statement

B.-K. Kim reports institutional research grants and speaker or consultant fees from Abbott, Yuhan Corporation, Samjin Pharmaceutical, Chong Kun Dang, Medtronic, Boston Scientific, Biotronik, Genoss, CGBIO, MicroPort, Daewoong Pharmaceutical, Amgen, Bayer Korea, DIO Medical, Hanmi, AstraZeneca, and Novartis. M.-K. Hong reports institutional research grants from Samjin Pharmaceutical and Chong Kun Dang; as well as honoraria for lectures from Medtronic and Edwards Lifesciences. Y. Jang reports an institutional research grant from Abbott. The other authors have no conflicts of interest to declare.

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Supplementary Appendix 1. Inclusion and exclusion criteria.

1. Inclusion criteria

(1) Patients aged 19–85 years.

(2) Patients with ischemic heart diseases (including stable angina, unstable angina, and acute myocardial infarction) who presented with typical chest pain and objective evidence of myocardial ischemia (positive invasive or non-invasive studies, an electrocardiogram consistent with ischemia, or elevated cardiac enzymes).

(3) Patients with complex coronary stenotic lesions (>50% based on a visual estimate) who are considered for coronary revascularization with everolimus-eluting Xience stents.

Definition of complex coronary lesions

① Acute myocardial infarction (ST-elevation or non-ST-elevation myocardial infarction)

② Long lesion (expected stent length ≥28 mm based on angiographic estimation)

③ Bifurcation lesion (true bifurcation lesions treated with either one- or two-stent technique and eligible for enrollment, irrespective of the use of rotablation)

④ Small vessel disease (reference vessel diameter of <2.5 mm)

⑤ Unprotected left main artery disease (not excluding ostial lesion)

⑥ In-stent restenosis

⑦ Calcified lesion (presence of severe calcification, showing radiopacities without cardiac motion before contrast injection, usually affecting both sides of the arterial lumen)

⑧ Intracoronary thrombus visible on angiography

⑨ Chronic total occlusion (thrombolysis in myocardial infarction [TIMI] flow grade 0 with at least a 3-month estimated duration of occlusion)

⑩ Bypass graft lesion

⑪ Stent thrombosis (definite stent thrombosis)

(4) Patients who provided signed informed consent.

2. Exclusion criteria

(1) Severe hepatic dysfunction (serum aminotransferase ≥3 times the normal reference values)

(2) Significant renal dysfunction (serum creatinine >2.0 mg/dL)

(3) Platelet count <100000 cells/mm^3 or >700000 cells/mm^3, white blood cell count <3000 cells/mm^3, hemoglobin <8.0 g/dL, or other known bleeding diathesis

(4) Hemodynamic instability during procedures or cardiogenic shock

(5) Left ventricular ejection fraction <30%

(6) Pregnant or potentially pregnant women

(7) Life expectancy of less than 1 year

(8) Inability to understand or provide informed consent

Supplementary Appendix 2. Protocols for the use of optical coherence tomography and quantitative coronary angiographic assessment.

1. Acquisition of optical coherence tomography (OCT) images

The OCT procedure was performed using a frequency-domain OCT system following the standard protocol. OPTIS™ Mobile System (Abbott Medical, MA, USA), capable of OCT-Angio co-registration and 3-D construction, was used in 14 centers; ILUMIEN™ (Abbott Medical, MA, USA) in 5 centers, and ILUMIEN OPTIS™ (Abbott Medical, MA, USA) in 1 center. A single OCT system was utilized with identical OCT catheters (Dragonfly Optis catheter). OCT images were generated at 100 frames/sec while a catheter was pulled back at 20 mm/sec. A continuous non-occlusive contrast-saline mixture was flushed through a guiding catheter at a rate of 4 to 5 mL/sec for 3–4 seconds. When a blood-free image was observed, the OCT system automatically initiated rapid pullback of the catheter. When available, the angiographic co-registration feature of the OPTIS Integrated System was fully utilized to determine optimal stent length and landing zones.

2. Selection of stent size in the OCT-guided group

The reference segment was set at a cross-section adjacent to the target lesion, which included the least (<50%) plaque burden (defined as a signal-poor region with a diffuse border) with a constant lumen area throughout the vessel route. Regarding stent sizing, the diameters were decided according to a distal lumen (preferentially) or a mean external elastic membrane (EEM) diameter (derived from two orthogonal measurements) reference-based sizing. The selected stent size was rounded up to the nearest available size from the mean distal lumen diameter or rounded down from the mean EEM diameter by 0.25 mm. Stent length was decided according to the distance between two reference segments with the least plaque burden. Stent deployment was purposed to cover the whole diseased segment with a lumen area <4 mm^2 and plaques with a thin fibrous cap lipid pool with an arc ≥180°.

3. OCT analyses and evaluation of parameters for stent optimization

The cross-sectional OCT images at an interval of 1 mm were examined by analysts using certified offline software (ILUMIEN™ OPTIS™ Offline Review Workstation; Abbott Medical, MA, USA) at an independent core laboratory. Stent optimization was assessed based on the degree of stent expansion, apposition, and edge dissection.

(1) Stent expansion

For the evaluation of stent expansion, cross-sectional minimal stent area, and proximal and distal reference lumen areas were measured to derive the absolute expansion (minimal stent cross-sectional area as an absolute measure) and relative expansion (ratio of minimal stent area to the mean reference lumen area [average of proximal and distal reference lumen area] or the distal reference lumen area).

(2) Stent apposition

For the evaluation of stent apposition, acute stent malapposition was defined as a >0 distance between the stent strut and vessel wall, not related to tissue material behind the struts or side branches. Finally, acute stent malapposition with a malapposed distance of <200 μm or <400 μm was assessed.

(3) Edge dissection

For the evaluation of edge dissection, lateral (the circumference of the vessel at the site of dissection) and longitudinal (length of dissection) extensions of dissection were measured along with dissection depth (the presence of intramural hematoma or penetration into media or adventitia).

4. Quantitative analyses of coronary angiography

Quantitative coronary angiographic analyses were performed by analysts who were blinded to patient information in an independent core laboratory using certified offline system (CASS system, Pie Medical Instruments, Maastricht, The Netherlands). The guiding catheter was used for magnification and calibration. The reference vessel diameter, minimal luminal diameter, and percent diameter stenosis were measured from diastolic frames in a single, matched view showing the smallest minimal lumen diameter. The diameter stenosis was determined using the following formula: (reference vessel diameter-minimal lumen diameter)/ reference vessel diameter ×100.

Supplementary Appendix 3. Definitions of study outcomes.

1. Cardiac death

Cardiac death was defined as death owing to cardiac causes (including myocardial infarction, cardiac tamponade, arrhythmia, and stroke related to the procedure or within 30 days after the procedure regardless of correlation), death related to complications from the procedures, and death for which cardiac cause could not be ruled out.[17]

2. Myocardial infarction

The definition of myocardial infarction was based on the third universal definition of myocardial infarction for spontaneous myocardial infarction.[16] All myocardial infarction events that are not peri-procedural are considered spontaneous myocardial infarction. This is defined as the presentation of clinical symptoms, a change in electrocardiogram (ECG), or abnormal imaging findings indicative of myocardial infarction, combined with an increase in creatine kinase myocardial band (CK-MB) fraction by at least three-fold of the upper limit of normal (ULN) range, or troponin I or troponin T levels above the 99th percentile of the ULN. Peri-procedural myocardial infarction was defined as an event during the peri-procedural period (the first 48 hours after percutaneous coronary intervention [PCI]) in accordance with an expert consensus document from the Society for Cardiovascular Angiography and Interventions.[18] In patients with normal baseline cardiac biomarkers, peri-procedural myocardial infarction was diagnosed based on a new biomarker elevation of CK-MB to ≥10x the ULN or cardiac troponin (I or T) to ≥70x the ULN without new ECG changes. Alternatively, it was diagnosed with CK-MB ≥5x ULN or cardiac troponin ≥35x ULN with new ECG changes (pathologic Q waves or new-onset left bundle branch block [LBBB]). In patients with elevated but stabilizing or declining cardiac biomarkers, peri-procedural myocardial infarction was diagnosed based on a new absolute increase in cardiac biomarkers (≥10x ULN for CK-MB or ≥5x ULN for cardiac troponin from the pre-procedural cardiac biomarker nadir). Lastly, in patients with elevated cardiac biomarkers not yet stabilized or in a declining state, new ST-segment elevation (or depression) plus worsening clinical symptoms (suggestive of myocardial infarction, heart failure, or cardiogenic shock) were required to diagnose peri-procedural myocardial infarction in addition to a new absolute increase in cardiac biomarkers (≥10x ULN for CK-MB or ≥5x ULN for cardiac troponin from the pre-procedural nadir cardiac biomarker levels).

3. Stent thrombosis

Stent thrombosis was classified according to the Academic Research Consortium definition and defined as definite or probable.[17] Definite stent thrombosis was diagnosed by either angiographic or pathological confirmation of intracoronary thrombus in the stent or within the segment 5 mm proximal or distal to the stent edge, concomitant with at least one of the following criteria within a 48-hour time window: acute onset of ischemic symptoms at rest, new ischemic changes documented on ECG, or typical rise and fall in cardiac biomarkers. Probable stent thrombosis was considered to have occurred in case of any unexplained death within 30 days of the index PCI, or myocardial infarction at any point after PCI associated with documented acute ischemia in the territory of the implanted coronary stent, in the absence of angiographic or pathological confirmation of intracoronary thrombus and no other apparent cause.

4. Ischemia-driven target-vessel revascularization

Ischemia-driven target-vessel revascularization was defined as any PCI repetition or surgical bypass of any segment of the target vessel.[17] The target vessel was defined as the entire major coronary vessel proximal and distal to the target lesion, which includes the upstream and downstream branches along with the target lesion itself. The target lesion was defined as a lesion revascularized in the index procedure. A revascularization was considered a clinically indicated ischemia if: (1) angiography at follow-up showed a percent diameter stenosis ≥50% (core laboratory quantitative coronary angiography assessment) with one of the following—a positive history of recurrent angina pectoris, presumably related to the target vessel; objective signs of ischemia at rest (ECG changes) or during exercise test, presumably related to the target vessel; abnormal results of any invasive functional diagnostic test; or (2) revascularization with diameter stenosis ≥70% occurred even in the absence of the above-mentioned ischemic signs or symptoms.

5. Contrast-induced nephropathy

Contrast-induced nephropathy was defined as an increase in serum creatinine level >25% or an absolute rise of serum creatinine level of 0.5 mg/dL (44.2 μmol/L) from baseline within 72 hours of the index procedure.[19]

6. Stroke

Stroke was defined as an acute cerebrovascular event that caused a neurological deficit lasting more than 24 hours, or an acute infarction demonstrated by imaging studies.[17]

7. Bleeding

Bleeding was defined as type 3 or 5 according to the Bleeding Academic Research Consortium (BARC) criteria.[20]

Supplementary Appendix 4. Further details on statistical analyses.

Categorical variables were presented as numbers (percentages), whereas continuous variables were presented as mean ± standard deviation or median (interquartile range), depending on their distribution. A subgroup analysis was conducted on patients with ACS to explore the association between ACS type (unstable angina vs. myocardial infarction) and imaging guidance strategy for the study outcomes. Among patients with ACS, sensitivity analyses for the primary outcome were performed in those meeting multiple complex lesion criteria defined in the trial or in those meeting alternative criteria based on definitions of complex PCI from previous studies (3 vessels treated, ≥3 lesions treated, ≥3 stents implanted, bifurcation with 2 stents implanted, total stent length >60 mm, use of atherectomy, or left main, bypass graft, or chronic total occlusion as target lesions).[14,21,22] In addition, exploratory analyses using univariate and multivariate logistic regression models were performed to identify independent determinants of stent sub-optimization following OCT-guided PCI, according to clinical presentation. Variable with $P<0.05$ in the univariate analysis were included in the multivariate model, and multicollinearity among them was assessed using variance inflation factors, with values <10 indicating the absence of significant multicollinearity.

Supplementary Table 1. Baseline characteristics according to clinical presentation and randomised imaging guidance strategy.

	ACS patients (N=790)				CCS patients (N=814)		
	OCT-guided (N=412)	**Angiography-guided (N=378)**	**P-value**		**OCT-guided (N=391)**	**Angiography-guided (N=423)**	**P-value**
Age, years	63 (56–70)	62 (55–69)	0.444		64 (58–70)	65 (59–71)	0.238
Sex			0.306				0.385
Female	79 (19.2)	61 (16.1)			78 (19.9)	96 (22.7)	
Male	333 (80.8)	317 (83.9)			313 (80.1)	327 (77.3)	
Body mass index, kg/m^2	24.9 (23.1–26.8)	25.1 (23.5–27.0)	0.202		24.7 (22.9–26.5)	24.2 (22.6–26.1)	0.030
Hypertension	222 (53.9)	206 (54.5)	0.919		244 (62.4)	245 (57.9)	0.217
Diabetes mellitus	132 (32.0)	120 (31.7)	0.991		129 (33.0)	142 (33.6)	0.920
Chronic kidney disease[a]	35 (8.5)	24 (6.3)	0.312		18 (4.6)	33 (7.8)	0.083
Dyslipidemia	345 (83.7)	302 (79.9)	0.190		339 (86.7)	359 (84.9)	0.518
Current smoker	105 (25.5)	103 (27.2)	0.630		44 (11.3)	55 (13.0)	0.512
Prior myocardial infarction	19 (4.6)	18 (4.8)	1.000		21 (5.4)	24 (5.7)	0.972
Prior percutaneous coronary intervention	81 (19.7)	62 (16.4)	0.273		90 (23.0)	97 (22.9)	1.000
Prior coronary bypass graft surgery	6 (1.5)	7 (1.9)	0.876		4 (1.0)	7 (1.7)	0.634
Prior stroke	22 (5.3)	22 (5.8)	0.890		16 (4.1)	24 (5.7)	0.378
Clinical presentation			0.219				-
CCS	-	-			391 (100.0)	423 (100.0)	
Unstable angina	248 (60.2)	215 (56.9)			-	-	
Non-ST-elevation myocardial infarction	118 (28.6)	105 (27.8)			-	-	
ST-elevation myocardial infarction	46 (11.2)	58 (15.3)			-	-	
Multivessel coronary artery disease	108 (26.2)	103 (27.2)	0.804		95 (24.3)	110 (26.0)	0.631
Left ventricular ejection fraction, %	58.0 (56.0–64.4)	59.0 (52.0–65.0)	0.945		59.0 (58.0–65.0)	60.0 (59.0–67.0)	<0.001
Antiplatelet therapy at discharge							

Aspirin	402 (97.6)	372 (98.4)	0.559		382 (97.7)	415 (98.1)	0.870
$P2Y_{12}$ inhibitor							
Any	408 (99.0)	371 (98.1)	0.452		382 (97.7)	421 (99.5)	0.051
Clopidogrel	251 (60.9)	230 (60.8)	1.000		360 (92.1)	391 (92.4)	0.950
Potent $P2Y_{12}$ inhibitor[b]	157 (38.1)	141 (37.3)	0.873		22 (5.6)	30 (7.1)	0.477

Data are mean ± SD, median (interquartile range), or number (%). ACS, acute coronary syndrome; CCS, chronic coronary syndrome; OCT, optical coherence tomography.

[a] Chronic kidney disease was defined as an estimated glomerular filtration rate of <60 mL/min/1.73m^2 of body surface area.

[b] Potent P2Y12 inhibitor indicates ticagrelor or prasugrel.

Supplementary Table 2. Lesion and procedural characteristics according to clinical presentation and randomised imaging guidance strategy.

	ACS patients (N=790)			CCS patients (N=814)		
	OCT-guided (N=412)	**Angiography-guided (N=378)**	**P-value**	**OCT-guided (N=391)**	**Angiography-guided (N=423)**	**P-value**
Complex lesion characteristics[a]						
Acute myocardial infarction	164 (39.8)	163 (43.1)	0.383	-	-	-
Long lesion[b]	265 (64.3)	254 (67.2)	0.438	310 (79.3)	323 (76.4)	0.359
Bifurcation lesion	81 (19.7)	84 (22.2)	0.425	107 (27.4)	109 (25.8)	0.663
Small vessel disease[c]	71 (17.2)	67 (17.7)	0.930	56 (14.3)	73 (17.3)	0.294
Unprotected left main artery disease	55 (13.3)	46 (12.2)	0.697	58 (14.8)	70 (16.5)	0.565
In-stent restenosis	41 (10.0)	37 (9.8)	1.000	45 (11.5)	48 (11.3)	1.000
Calcified lesion[d]	35 (8.5)	31 (8.2)	0.984	36 (9.2)	47 (11.1)	0.435
Intracoronary thrombus visible on angiography	65 (15.8)	48 (12.7)	0.257	5 (1.3)	12 (2.8)	0.191
Chronic total occlusion	38 (9.2)	23 (6.1)	0.129	19 (4.9)	35 (8.3)	0.070
Bypass graft lesion	0 (0.0)	1 (0.3)	0.478	0 (0.0)	2 (0.5)	0.500
Stent thrombosis	0 (0.0)	1 (0.3)	0.478	0 (0.0)	0 (0.0)	1.000
Procedural characteristics[e]						
Total number of treated complex lesions	492	452		452	498	
Number of stents implanted per patient	1 (1–2)	1 (1–2)	0.905	1 (1–2)	1 (1–2)	0.458
Stent diameter, mm	3.2 (3.0–3.5)	3.0 (2.8–3.4)	<0.001	3.2 (3.0–3.5)	3.0 (2.9–3.4)	<0.001
Total stent length, mm	36.1 (28.9–54.0)	36.1 (28.6–55.6)	0.816	38.1 (29.7–53.1)	36.9 (28.4–49.5)	0.074
Adjunct post-dilatation	466 (94.7)	417 (92.3)	0.161	441 (97.6)	484 (97.2)	0.873
High-pressure post-dilatation	323 (65.7)	185 (40.9)	<0.001	300 (66.4)	240 (48.2)	<0.001
Maximal inflation pressure, atmosphere	18.0 (16.0–20.0)	14.0 (12.0–17.0)	<0.001	18.0 (16.0–20.0)	15.0 (12.0–17.0)	<0.001
Contrast volume used per patient, mL	265 (200–358)	200 (170–250)	<0.001	320 (240–420)	220 (180–280)	<0.001
Procedural time per patient, min	50.0 (39.5–64.0)	43.0 (30.0–55.0)	<0.001	56.0 (41.0–75.0)	44.0 (30.0–62.0)	<0.001

Quantitative coronary angiographic analyses[e]							
Pre-procedural reference vessel diameter, mm	2.78 (2.52–3.13)	2.81 (2.55–3.12)	0.464		2.86 (2.55–3.13)	2.79 (2.48–3.11)	0.166
Pre-procedural minimal lumen diameter, mm	0.71 (0.44–0.96)	0.68 (0.45–0.94)	0.318		0.69 (0.52–0.91)	0.71 (0.44–0.94)	0.932
Pre-procedural diameter stenosis, %	74.4 (66.2–83.4)	75.7 (66.7–84.4)	0.223		75.0 (68.9–82.3)	74.7 (67.4–83.3)	0.661
Lesion length, mm	31.2 (24.3–49.6)	31.0 (24.0–50.7)	0.852		33.3 (25.1–48.4)	32.0 (24.1–44.6)	0.082
Post-procedural minimal lumen diameter, mm	2.78 (2.51–3.11)	2.61 (2.39–2.89)	<0.001		2.72 (2.46–3.01)	2.57 (2.35–2.88)	<0.001
Post-procedural diameter stenosis, %	11.1 (6.5–16.5)	14.0 (8.6–19.0)	<0.001		13.0 (9.0–17.0)	14.0 (10.0–19.0)	<0.001

Data are mean ± SD, median (interquartile range), or number (%). ACS, acute coronary syndrome; CCS, chronic coronary syndrome; OCT, optical coherence tomography.

[a] Patients may have had more than one qualifying characteristic of complex lesions.

[b] Long lesion was defined as a lesion requiring stent length ≥28 mm.

[c] Small vessel disease was defined as a lesion with reference vessel diameter <2.5 mm.

[d] Calcified lesion was defined as a lesion with severe calcification, showing radiopacities without cardiac motion before contrast injection, usually affecting both sides of the arterial lumen.

[e] Procedural characteristics and quantitative coronary angiographic analyses data are per-lesion analyses, unless stated otherwise.

Supplementary Table 3. Duration of DAPT according to clinical presentation and complex lesion characteristics[a].

	Total population (N=1513)	ACS patients (N=750)	CCS patients (N=763)
Acute myocardial infarction			
Number of patients	307	307	-
Duration of DAPT, months	6 (6–12)	6 (6–12)	-
Long lesion			
Number of patients	1110	505	605
Duration of DAPT, months	6 (6–12)	6 (6–12)	6 (6–12)
Bifurcation lesion			
Number of patients	358	157	201
Duration of DAPT, months	6 (6–12)	6 (6–12)	6 (6–12)
Small vessel disease			
Number of patients	247	129	118
Duration of DAPT, months	6 (6–12)	6 (6–12)	6 (6–12)
Unprotected left main artery disease			
Number of patients	218	94	124
Duration of DAPT, months	6 (6–12)	6 (6–12)	6 (6–12)
In-stent restenosis			
Number of patients	158	75	83
Duration of DAPT, months	6 (6–12)	6 (6–12)	6 (6–12)
Calcified lesion			
Number of patients	141	64	77
Duration of DAPT, months	6 (6–12)	6 (6–12)	6 (6–12)
Intracoronary thrombus visible on angiography			
Number of patients	122	107	15
Duration of DAPT, months	6 (6–12)	6 (6–12)	6 (6–12)
Chronic total occlusion			

Number of patients	110	58	52
Duration of DAPT, months	6 (6–12)	6 (6–12)	6 (6–12)
Bypass graft lesion			
Number of patients	3	1	2
Duration of DAPT, months	6 (6–9)	6 (6–6)	9 (6–12)
Stent thrombosis			
Number of patients	1	1	-
Duration of DAPT, months	6 (6–6)	6 (6–6)	-

Data are mean ± SD, median (interquartile range), or number (%). ACS, acute coronary syndrome; CCS, chronic coronary syndrome; DAPT, dual antiplatelet therapy.

[a] Among total patients, 1513 (94.3%) had complete data available regarding the duration of DAPT.

Supplementary Table 4. Clinical outcomes according to ACS type and randomised imaging guidance strategy.

	Unstable angina (N=463)					Myocardial infarction (N=327)				$P_{interaction}$[a]
	OCT-guided (N=248)	Angiography-guided (N=215)	HR (95% CI)	P-value		OCT-guided (N=164)	Angiography-guided (N=163)	HR (95% CI)	P-value	
Primary outcome										
Major adverse cardiac events (composite of cardiac death, myocardial infarction, stent thrombosis, or ischemia-driven target-vessel revascularization)	10 (4.0)	18 (8.4)	0.47 (0.22–1.03)	0.052		10 (6.1)	18 (11.0)	0.55 (0.25–1.18)	0.112	0.815
Secondary outcomes										
All-cause death	1 (0.4)	1 (0.5)	0.87 (0.05–13.88)	0.920		2 (1.2)	2 (1.2)	0.99 (0.14–7.03)	0.993	0.940
Cardiac death	0 (0.0)	1 (0.5)	-	0.284		0 (0.0)	2 (1.2)	-	0.156	-
Myocardial infarction	5 (2.0)	11 (5.1)	0.39 (0.14–1.13)	0.070		10 (6.1)	15 (9.2)	0.66 (0.30–1.46)	0.288	0.447
Spontaneous myocardial infarction	1 (0.4)	5 (2.3)	0.17 (0.02–1.47)	0.069		3 (1.8)	3 (1.8)	0.99 (0.20–4.89)	0.988	0.201
Target-vessel related	1	5				2	1			
Non-target-vessel related	0	0				1	2			
Peri-procedural myocardial infarction	4 (1.6)	6 (2.8)	0.58 (0.16–2.05)	0.387		7 (4.3)	12 (7.4)	0.58 (0.23–1.46)	0.231	0.996
Stent thrombosis	1 (0.4)	2 (0.9)	0.43 (0.04–4.78)	0.482		2 (1.2)	2 (1.2)	0.99 (0.14–7.02)	0.991	0.601
Definite	0	1				1	2			

Probable	1	1				1	0			
Ischemia-driven target-vessel revascularization	6 (2.4)	12 (5.6)	0.43 (0.16–1.14)	0.080		2 (1.2)	3 (1.9)	0.66 (0.11–3.96)	0.648	0.677
Target-lesion revascularization	4	9				2	3			
Non-target-lesion revascularization	2	3				0	0			
Any revascularization	7 (2.8)	15 (7.0)	0.40 (0.16–0.97)	0.036		2 (1.2)	6 (3.7)	0.33 (0.07–1.63)	0.151	0.840
Stroke	1 (0.4)	1 (0.5)	0.87 (0.05–13.89)	0.921		0 (0.0)	1 (0.6)	-	0.316	-
Bleeding (BARC type 3 or 5)	2 (0.8)	1 (0.5)	1.74 (0.16–19.23)	0.646		1 (0.6)	1 (0.6)	0.99 (0.06–15.79)	0.993	0.762
Contrast-induced nephropathy	3 (1.2)	2 (0.9)	1.30 (0.22–7.78)	0.773		2 (1.2)	2 (1.2)	0.99 (0.14–7.06)	0.995	0.843
Achievement of stent optimization by OCT[b]	167/238 (70.2)					112/155 (72.3)				
Post-hoc composite outcomes[c]										
Cardiac death, myocardial infarction, or stent thrombosis	5 (2.0)	11 (5.1)	0.39 (0.14–1.13)	0.070		10 (6.1)	16 (9.8)	0.62 (0.28–1.36)	0.213	0.505
Cardiac death, spontaneous myocardial infarction, stent thrombosis, or ischemia-driven target-vessel revascularization	6 (2.4)	12 (5.6)	0.43 (0.16–1.14)	0.080		3 (1.8)	6 (3.7)	0.50 (0.12–1.98)	0.310	0.868
Cardiac death, spontaneous myocardial infarction, or stent thrombosis	1 (0.4)	4 (1.9)	0.22 (0.02–1.93)	0.131		3 (1.8)	4 (2.5)	0.74 (0.17–3.31)	0.694	0.361

Data are number (% of the cumulative rates at 1 year according to Kaplan-Meier event rates), unless stated otherwise. ACS, acute coronary syndrome; BARC, Bleeding

Academic Research Consortium; CI, confidence interval; HR, hazard ratio; OCT, optical coherence tomography.

[a] P-value for interaction between ACS type and imaging guidance strategy.

[b] Data are number of patients/total number of patients (%). Stent optimization was defined as acceptable stent expansion, apposition, and edge dissection, and was assessed in the OCT-guided group with available final post-stent OCT evaluation, which included 238 patients with unstable angina and 155 patients with myocardial infarction.

[c] Analyzed as post-hoc endpoints in the OCCUPI (Optical Coherence Tomography-guided Coronary Intervention in Patients with Complex Lesions) trial.

Supplementary Table 5. Clinical outcomes according to clinical presentation and stent optimisation among patients assigned to OCT guidance[a].

	ACS patients with OCT guidance (N=393)					CCS patients with OCT guidance (N=374)			
	Stent optimization (N=279)	**Stent sub-optimization (N=114)**	**HR (95% CI)**	**P-value**		**Stent optimization (N=266)**	**Stent sub-optimization (N=108)**	**HR (95% CI)**	**P-value**
Primary outcome									
Major adverse cardiac events (composite of cardiac death, myocardial infarction, stent thrombosis, or ischemia-driven target-vessel revascularization)	8 (2.9)	11 (9.7)	0.29 (0.12–0.72)	0.004		8 (3.0)	8 (7.4)	0.40 (0.15–1.07)	0.057
Secondary outcomes									
All-cause death	2 (0.7)	1 (0.9)	0.81 (0.07–8.96)	0.865		2 (0.8)	0 (0.0)	-	0.367
Cardiac death	0 (0.0)	0 (0.0)	-	-		1 (0.4)	0 (0.0)	-	0.524
Myocardial infarction	6 (2.2)	8 (7.0)	0.30 (0.11–0.87)	0.018		7 (2.6)	6 (5.6)	0.47 (0.16–1.40)	0.162
Spontaneous myocardial infarction	2 (0.7)	1 (0.9)	0.82 (0.07–9.01)	0.869		1 (0.4)	2 (1.9)	0.20 (0.02–2.22)	0.147
Target-vessel related	1	1				0	2		
Non-target-vessel related	1	0				1	0		
Peri-procedural myocardial infarction	4 (1.4)	7 (6.1)	0.23 (0.07–0.79)	0.010		6 (2.3)	4 (3.7)	0.61 (0.17–2.17)	0.440
Stent thrombosis	2 (0.7)	1 (0.9)	0.82 (0.07–9.02)	0.870		0 (0.0)	1 (0.9)	-	0.118
Definite	1	0				0	1		

Probable	1	1				0	0		
Ischemia-driven target-vessel revascularization	3 (1.1)	4 (3.5)	0.30 (0.07–1.36)	0.098		0 (0.0)	4 (3.7)	-	0.002
Target-lesion revascularization	2	3				0	3		
Non-target-lesion revascularization	1	1				0	1		
Contrast-induced nephropathy	3 (1.1)	2 (1.8)	0.61 (0.10–3.67)	0.587		3 (1.1)	2 (1.9)	0.61 (0.10–3.63)	0.580
Post-hoc composite outcomes[b]									
Cardiac death, myocardial infarction, or stent thrombosis	6 (2.2)	8 (7.0)	0.30 (0.11–0.87)	0.018		8 (3.0)	6 (5.6)	0.54 (0.19–1.55)	0.239
Cardiac death, spontaneous myocardial infarction, stent thrombosis, or ischemia-driven target-vessel revascularization	4 (1.4)	4 (3.5)	0.41 (0.10–1.62)	0.187		2 (0.8)	4 (3.7)	0.20 (0.04–1.09)	0.063
Cardiac death, spontaneous myocardial infarction, or stent thrombosis	2 (0.7)	1 (0.9)	0.82 (0.07–9.01)	0.869		2 (0.8)	2 (1.9)	0.40 (0.06–2.86)	0.347

Data are number (% of the cumulative rates at 1 year according to Kaplan-Meier event rates). ACS, acute coronary syndrome; CCS, chronic coronary syndrome; CI, confidence interval; HR, hazard ratio; OCT, optical coherence tomography.

[a] Out of the 803 patients assigned to OCT guidance in the OCCUPI (Optical Coherence Tomography-guided Coronary Intervention in Patients with Complex Lesions) trial, 767 (393 with ACS and 374 with CCS) had final post-stent OCT available for stent optimization evaluation, excluding those who did not undergo percutaneous coronary intervention with OCT guidance (N=25), had no post-stent OCT (N=9), or had poor image quality (N=2).

[b] Analyzed as post-hoc endpoints in the OCCUPI trial.

Supplementary Table 6. Independent determinants of stent suboptimisation following OCT-guided PCI, according to clinical presentation.

Variable	ACS patients with OCT guidance					CCS patients with OCT guidance			
	Univariate analysis		Multivariate analysis			Univariate analysis		Multivariate analysis	
	OR (95% CI)	P-value	OR (95% CI)	P-value		OR (95% CI)	P-value	OR (95% CI)	P-value
Age	1.00 (0.98–1.02)	0.835				1.00 (0.98–1.03)	0.858		
Female sex	1.08 (0.62–1.86)	0.788				1.33 (0.77–2.30)	0.299		
Body mass index	1.00 (0.93–1.08)	0.994				0.99 (0.91–1.07)	0.771		
Hypertension	1.28 (0.82–1.99)	0.272				1.00 (0.63–1.59)	0.999		
Diabetes mellitus	1.17 (0.74–1.86)	0.496				1.82 (1.15–2.90)	0.011	1.51 (0.89–2.55)	0.128
Chronic kidney disease	1.19 (0.56–2.53)	0.653				1.13 (0.38–3.32)	0.831		
Dyslipidemia	0.74 (0.42–1.32)	0.311				1.56 (0.77–3.17)	0.218		
Current smoker	1.14 (0.70–1.87)	0.592				0.72 (0.34–1.52)	0.389		
Prior myocardial infarction	0.28 (0.06–1.21)	0.088				2.33 (0.92–5.90)	0.075		
Prior percutaneous coronary intervention	1.14 (0.67–1.95)	0.621				1.20 (0.71–2.02)	0.504		
Prior coronary bypass graft surgery	1.23 (0.22–6.80)	0.814				0.82 (0.08–7.97)	0.864		
Prior stroke	0.87 (0.31–2.47)	0.791				2.24 (0.79–6.33)	0.130		
Multivessel coronary artery disease	0.89 (0.54–1.46)	0.635				0.56 (0.32–1.00)	0.048	0.76 (0.33–1.78)	0.531
Left ventricular ejection fraction	0.99 (0.97–1.07)	0.181				1.01 (0.98–1.03)	0.674		
Acute myocardial infarction	0.90 (0.58–1.41)	0.656				-	-		
Long lesion[a]	2.19 (1.34–3.59)	0.002	1.21 (0.69–2.13)	0.503		2.85 (1.44–5.65)	0.003	3.08 (1.43–6.64)	0.004
Bifurcation lesion	0.83 (0.47–1.46)	0.513				1.16 (0.71–1.90)	0.565		
Small vessel disease[b]	1.00 (0.56–1.77)	0.996				1.00 (0.52–1.91)	0.996		
Unprotected left main artery disease	0.62 (0.31–1.25)	0.183				0.38 (0.17–0.84)	0.017	1.03 (0.33–3.24)	0.954

In-stent restenosis	0.80 (0.38–1.69)	0.556				1.61 (0.82–3.13)	0.165		
Calcified lesion[c]	1.07 (0.49–2.33)	0.864				0.88 (0.40–1.95)	0.746		
Intracoronary thrombus visible on angiography	0.69 (0.36–1.31)	0.259				-	-		
Chronic total occlusion	1.86 (0.92–3.76)	0.083				1.86 (0.73–4.75)	0.198		
Number of stents implanted	1.54 (1.16–2.03)	0.003	1.34 (0.98–1.82)	0.065		1.25 (0.94–1.65)	0.124		
Stent diameter	0.11 (0.05–0.22)	<0.001	0.15 (0.07–0.36)	<0.001		0.04 (0.02–0.09)	<0.001	0.08 (0.03–0.23)	<0.001
Total stent length	1.00 (0.99–1.01)	0.521				1.01 (0.99–1.02)	0.303		
Adjunct post-dilatation	1.46 (0.47–4.53)	0.514				4.18 (0.53–33.06)	0.175		
High-pressure post-dilatation	1.11 (0.69–1.77)	0.670				1.18 (0.73–1.89)	0.499		
Maximal inflation pressure	0.92 (0.85–0.99)	0.040	0.90 (0.83–0.98)	0.016		1.07 (0.99–1.16)	0.073		
Pre-procedural reference vessel diameter[d]	0.25 (0.14–0.44)	<0.001	0.54 (0.28–1.04)	0.064		0.13 (0.06–0.25)	<0.001	0.37 (0.15–0.91)	0.030
Pre-procedural minimal lumen diameter[d]	0.60 (0.32–1.10)	0.096				0.47 (0.24–0.93)	0.031	1.07 (0.48–2.42)	0.863
Pre-procedural diameter stenosis[d]	1.01 (0.99–1.02)	0.602				1.01 (0.99–1.03)	0.619		
Lesion length[d]	1.00 (0.99–1.01)	0.458				1.01 (0.99–1.02)	0.204		

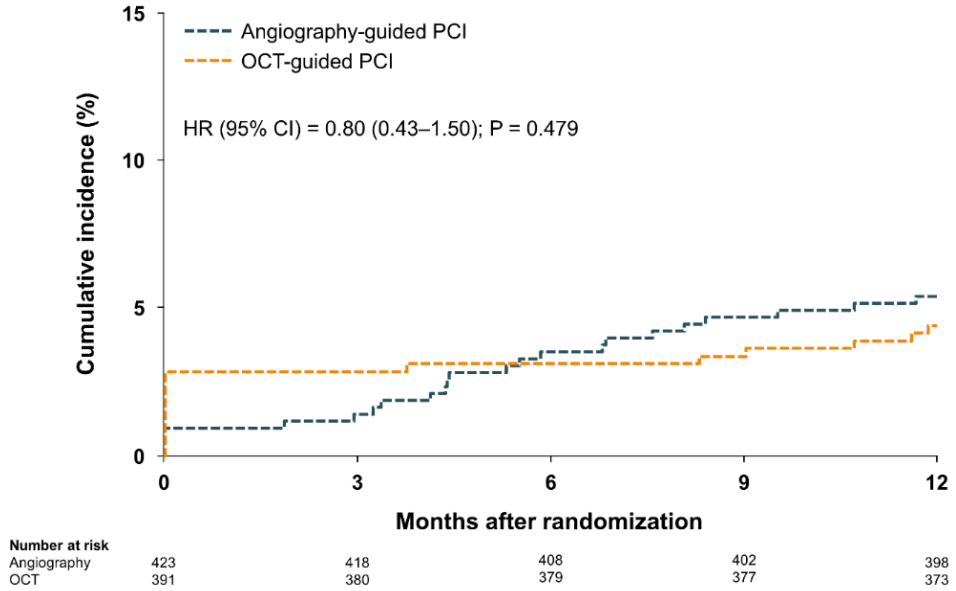
Variable with P<0.05 in the univariate analysis were included in the multivariate model. ACS, acute coronary syndrome; CCS, chronic coronary syndrome; CI, confidence interval; OCT, optical coherence tomography; OR, odds ratio; PCI, percutaneous coronary intervention.

[a] Long lesion was defined as a lesion requiring stent length ≥28 mm.

[b] Small vessel disease was defined as a lesion with reference vessel diameter <2.5 mm.

[c] Calcified lesion was defined as a lesion with severe calcification, showing radiopacities without cardiac motion before contrast injection, usually affecting both sides of the arterial lumen.

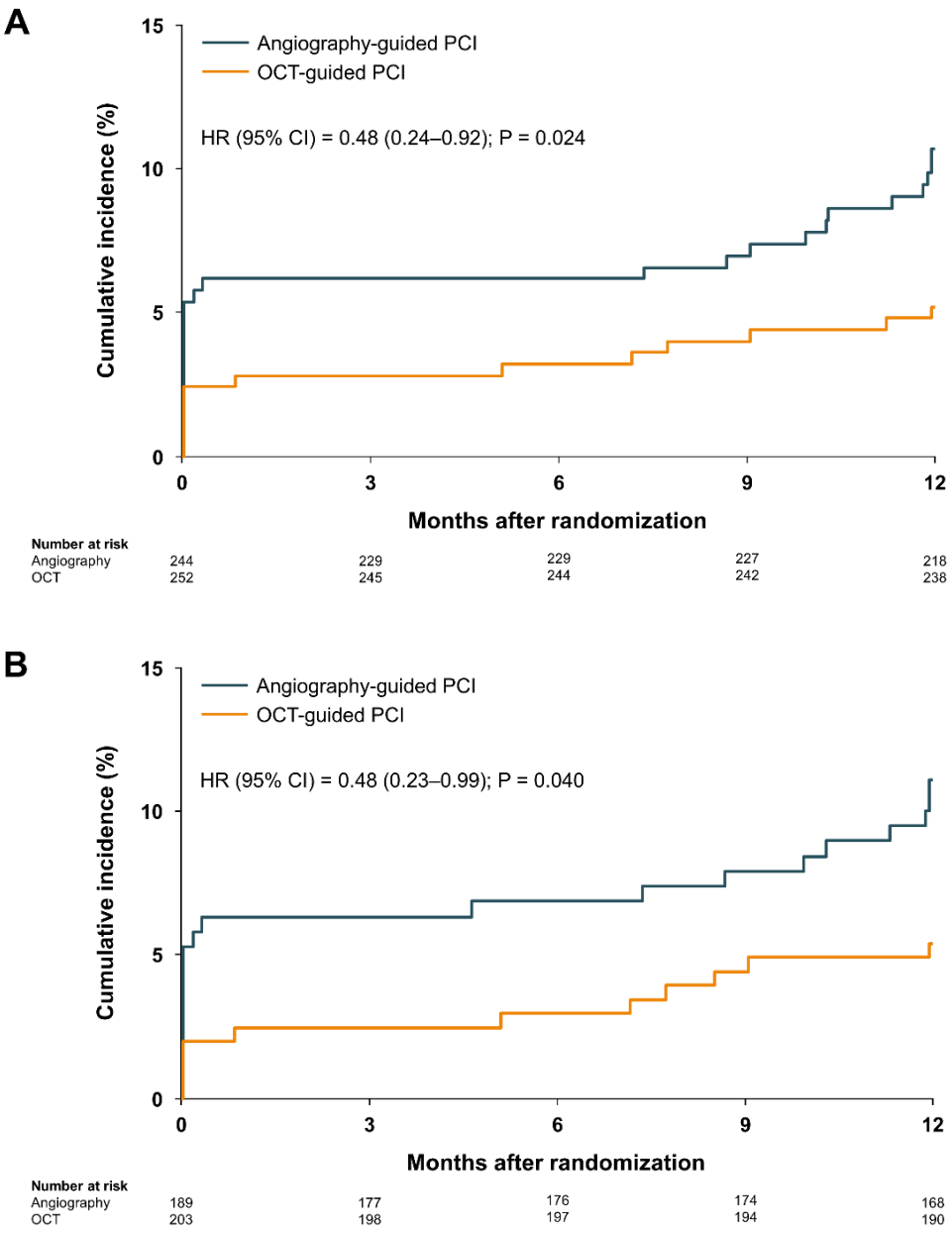
[d] Quantitative coronary angiographic analyses.



Supplementary Figure 1. Time-to-event curves for the primary outcome according to randomised imaging guidance strategy among patients with CCS.

Kaplan–Meier survival curves for the primary outcome according to randomized imaging guidance strategy among patients with CCS.

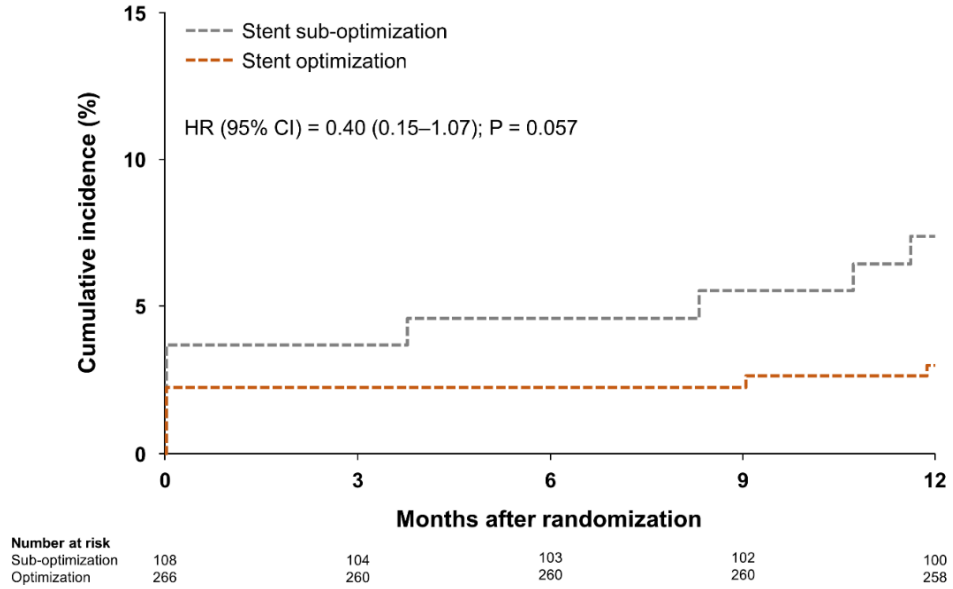
CCS, chronic coronary syndrome; CI, confidence interval; HR, hazard ratio; OCT, optical coherence tomography; PCI, percutaneous coronary intervention.



Supplementary Figure 2. Time-to-event curves for the primary outcome according to randomised imaging guidance strategy among patients with ACS meeting multiple complex lesion criteria or alternative criteria.

Kaplan–Meier survival curves for the primary outcome according to randomized imaging guidance strategy among patients with ACS meeting multiple complex lesion criteria defined in the OCCUPI (Optical Coherence Tomography-guided Coronary Intervention in Patients with Complex Lesions) trial (A) or alternative criteria based on definitions of complex PCI from previous studies (3 vessels treated, ≥3 lesions treated, ≥3 stents implanted, bifurcation with 2 stents implanted, total stent length >60 mm, use of atherectomy, or left main, bypass graft, or chronic total occlusion as target lesions) (B).[14,21,22]

ACS, acute coronary syndrome; CI, confidence interval; HR, hazard ratio; OCT, optical coherence tomography; PCI, percutaneous coronary intervention.



Supplementary Figure 3. Time-to-event curves for the primary outcome according to stent optimisation among patients with CCS assigned to OCT guidance.

Kaplan–Meier survival curves for the primary outcome according to stent optimization among patients with CCS assigned to OCT guidance. Patients with stent optimization were defined as those with acceptable stent expansion, apposition, and edge dissection on the final post-stent OCT evaluation.

CCS, chronic coronary syndrome; CI, confidence interval; HR, hazard ratio; OCT, optical coherence tomography.