Online Supplementary Materials

Supplementary methods:

We calculated the absolute risk difference using the formula: rate ratio (RR) from meta-analysis-1 x baseline risk (patient's expected event rate). (1) We extracted the raw event data for baseline risk estimation for each trial, focusing on the angiographic guided PCI arm. First, we extracted the raw event data for each trial, i.e., the number of patients at risk and the number of event occurrences.

To combine these risks, we used a standard random-effects meta-analysis, which allows for between-study heterogeneity. We computed the proportion of patients experiencing an event in the PCI arm for each study and then calculated the associated standard error (SE).

Subsequently, we used these proportions and SEs in our meta-analysis to estimate the combined baseline risk. This approach assumes that the true effect varies between studies and follows a certain distribution. It considers both within-study and between-study variation to provide a more conservative estimate compared to a fixed-effects model, especially when there is significant heterogeneity among studies.

We also used SYNTAX 5-year data for baseline risk in the PCI arm, assuming RRs remain consistent across subgroups and over time. (1-3) The SYNTAX scoring system defines three risk categories: *low* risk (0-22), *intermediate* risk (22-32), and *high* risk (≥33). (4) We preferred SYNTAX as it offers a detailed estimation of the complexity and extent of CAD.

The SYNTAX trial (4) reported baseline risk for cardiac death, MI, all-cause mortality, and repeat revascularization. We estimated proportional event rates relative to repeat revascularization based on the RENOVATE-COMPLEX PCI trial to estimate target vessel revascularization (TVR) and target lesion revascularization (TLR) event rates. (5) We then applied those rates to repeat revascularization rates reported in the SYNTAX 5-year data. (4) we assumed a linear relationship between MACE and stent thrombosis to determine the stent thrombosis rate. Suppose MACE rate is 42.9% (summary rates from registries reported in Table 2 of paper by Mohr and Serruys) (4) and stent thrombosis rate is 2.25%: Stent thrombosis rate = k * MACE rate, $2.25 = k * 42.9$, $k = 2.25 / 42.9 \approx 0.0524$. Then, we used the value of k to calculate the stent thrombosis rate using different base rates for MACEs as categorized by SYNTAX. We also estimated absolute risk differences (ARDs) using the SYNTAX-II scoring system.

We used the mean increase in procedural time (min) and absolute risk differences for cardiovascular outcomes to estimate the trade-off between procedural time and cardiovascular outcomes, assuming a linear correlation between time and outcomes.

Supplementary Table A: Search strategy of MEDLINE.

No.	Search terms	Records
1	angiography.mp. OR exp Angiography/	345,724
2	intravascular ultrasound.mp.	8,592
3	IVUS.mp.	5,141
4	optical coherence tomography.mp. OR exp Tomography, Optical Coherence/	62,585
5	OCT.mp.	47,669
6	percutaneous coronary intervention.mp. OR exp Percutaneous Coronary Intervention/	77,855
7	PCI.mp.	33,439
8	2 OR 3	9,271
9	4 OR 5	79,015
10	6 OR 7	84,596
11	8 OR 9	87,134
12	1 AND 10 AND 11	2,145

Supplementary Table B: Search strategy of EMBASE.

No.	Search terms	Records
1	Intravascular ultrasound.mp. OR exp intravascular ultrasound/	21,941
2	IVUS.mp.	10,791
3	angiography.mp. OR exp angiography/	566,366
4	exp optical coherence tomography/ OR optical coherence tomography.mp.	96,279
5	percutaneous coronary intervention.mp. OR exp percutaneous coronary intervention/	132,624
6	pci.mp.	73,883
7	oct.mp.	83,726
8	1 OR 2	24,095
9	5 OR 6	155,589
10	4 OR 7	130,628
11	8 OR 10	150,830
12	3 AND 9 AND 11	2,561

Supplementary Table C: Search strategy of Cochrane library.

No.	Search terms	Records
#1	angiography (Word variations have been searched)	18361
#2	[mh angiography] (Word variations have been searched)	8490
#3	PCI (Word variations have been searched)	10101
#4	percutaneous coronary intervention (Word variations have been searched)	13000
#5	[mh "percutaneous coronary intervention"] (Word variations have been searched)	7393
#6	OCT (Word variations have been searched)	13284
#7	optical coherence tomography	4983
#8	[mh "optical coherence tomography"] (Word variations have been searched)	1873
#9	IVUS (Word variations have been searched)	1009
#10	intravascular ultrasound (Word variations have been searched)	1670
#11	[mh "intravascular ultrasound"]	1256
#12	#1 OR #2	19033
#13	#3 OR #4 OR #5	17571
#14	#6 OR #7 OR #8	15517
#15	#9 OR #10 OR #11	1881
#16	#14 OR #15	17137
#17	#12 AND #13 AND #16	558

Supplementary Table D: Characteristics of included randomized controlled trials.

Trial, year	Sample size (n)	Setting	Drug-eluting stent type	Primary endpoint	Secondary endpoint	Inclusion criteria	Exclusion criteria	Follow-up (months)
Intravascular Ultrasound vs. Angiography-guided Percutaneous Coronary Intervention								
AIR CTO 2015	230	Multi-center	First/Second generation	In-stent late lumen loss at one year of follow-up.	All-cause death, cardiac death, myocardial infarction (MI), in-stent restenosis (ISR), target lesion revascularization (TLR), and target vessel revascularization (TVR). The rate of definite/probable ST served as a safety endpoint	Age 18-80 years, diagnosis of documented silent ischemia, stable angina, unstable angina, or previous myocardial infarction (MI)	Age >80 years, pregnant women, liver dysfunction, creatinine >2.5 mg/dl, major bleeding or stroke within six months, plate-let count <8×109/L, white blood cells <40×109/L, life expectancy<12 months, allergy to the study medications, failure of recanalization in a CTO lesion, or presence of STEMI <24 hours from the onset of chest pain to the time of admission to the hospital, and intolerance to dual antiplatelet therapy	24
AVIO 2013	284	Multi-center	First generation	Post-procedure in lesion minimal lumen diameter.	Target lesion revascularization (TLR) at 9 months and major adverse cardiovascular event (MACE) at 30 days, 6, 9, 12, and 24 months. MACE was defined as the composite of any MI, cardiac death, and target vessel revascularization (TVR).	All consecutive patients from 18 centers, with complex lesions suitable for DES implantation. Complex lesions were defined as one of the following: long lesions (N28 mm); chronic total occlusions (CTO), i.e., total occlusion of duration more than 3 months; lesions involving bifurcation; small vessels (≤2.5mm) and patients requiring 4 or more stents.	Contraindication to dual antiplatelet therapy; ejection fraction < 30%; renal failure(creatinine > 2 mg/dL); significant comorbidities precluding clinical follow-up; MI in the 48 hours prior to the procedure; in-stent restenosis; prior brachytherapy; venous or arterial grafts; unprotected left main stem stenosis; thrombocytopenia (<100,000); recipient of a heart transplant; a positive pregnancy test in women of childbearing potential; acute infection; planned major surgery leading to discontinuation of	24

							antiplatelet therapy or prior bare metal stent; or DES implanted in the target vessel less than 1 year before enrolment (including 1 year from any intercurrent restenotic or thrombotic event)	
HOME DES IVUS 2009	210	Single-center	First generation	Major adverse cardiac events (MACE), including death, myocardial infarction (MI), and target lesion revascularization (TLR)	Stent thrombosis was classified according to Academic Research Consortium (ARC) as definite, probable, or possible and as early (0–30 days), late (31–360 days), or very late (>360 days)	Patients with either complex coronary lesions or patients characteristics and therefore patients who fulfilled the following criteria: Lesion type B_2 and C according to the American Heart Association, proximal left anterior descending artery, left main disease, reference vessel diameter <2.5 mm, lesion length >20 mm, in-stent restenosis, insulin-dependent diabetes mellitus, and acute coronary syndrome were included in this study.	Not reported	18
CTO-IVUS 2015	402	Multi-center	New generation	Occurrence of cardiac death	Major adverse cardiac event (MACE), defined as the composite of cardiac death, myocardial infarction (MI), or target-vessel revascularization at 12 months	Patients with CTO who were aged 20 to 80 years and had typical symptomatic angina or positive test results for functional evaluation of ischemia	Unprotected left main disease or in-stent restenosis; presentation of acute coronary syndrome at CTO intervention; left ventricle ejection fraction <30%; and IVUS use before randomization	12
IVUS-XPL 2020	1323	Multi-center	New generation	Composite of major adverse cardiac events,	Cardiac death, target lesion-related myocardial infarction, ischemia-	Patients with typical chest pain or evidence of myocardial	Acute ST-elevation myocardial infarction within 48 hrs. Contraindication for	60

				including cardiac death, target lesion-related myocardial infarction, or ischemia-driven target lesion revascularization	driven target lesion revascularization, definite or probable stent thrombosis.	ischemia were eligible for enrollment if implantation of an everolimus-eluting stent for long coronary lesions (implanted stent≥28 mm in length was indicated based on angiographic estimation	anti-platelet agents and bleeding history within the prior 3 months. Known hypersensitivity, and contraindication to any of the following medications: heparin, aspirin, clopidogrel. Prior history of the following presentations - Cerebral vascular accident (not including transient ischemic attack) - Peripheral artery occlusive disease - Thromboembolic disease - Stent thrombosis. Age; older than 80 years. Severe hepatic dysfunction (> 3 times normal reference values). Significant renal dysfunction (Serum creatinine >2.0 mg/dl). Significant leucopenia, neutropenia, thrombocytopenia, anemia, or known bleeding diathesis. Cardiogenic shock. Left ventricular ejection fraction	
MOZART 2014	83	Multi-center	Not reported	The total volume of contrast agent used during PCI	Major Adverse Cardiac Events Defined as the composite of death, myocardial infarction, or repeat revascularization. Incidence of contrast-induced nephropathy	Patients 18 years of age and older scheduled for PCI were considered for enrollment in the MOZART trial. Included patients were at high risk of CI-AKI or volume overload, according to the presence of >1 of the following criteria: 1) older than >75 years of age; 2) diabetes; 3)	Use of iodinated contrast agents<72 h or other nephrotoxic agents<7 days before the procedure, known allergy to contrast agents, and unstable or unknown renal function before PCI.	4

						acute ischemic syndrome needing urgent or emergent PCI; 4) creatinine clearance<60 ml/min/1.73 m^2 or a single remaining kidney or previous renal transplantation;5) congestive heart failure, pulmonary congestion, severe left ventricular dysfunction (ejection fraction<45%), cardiogenic shock, or intra-aortic balloon pumping. Angiographic eligibility required that all target vessels be amenable to IVUS imaging at baseline (i.e., before any balloon dilation), as judged by an experienced interventionalist.		
RESET 2013	543	Multi-center	Second generation	Occurrence of major adverse cardiac events (MACE), including cardiovascular death, myocardial infarction, stent thrombosis, or target vessel	Not reported	Patients were eligible if they were over 20 years of age and had a de novo lesion requiring a stent ≥28 mm in length in a vessel with a distal reference diameter ≥2.5 mm by visual angiographic estimation	Patients with a bleeding history within the prior 3 months; known hypersensitivity to heparin, aspirin, clopidogrel, or a litmus-related drug; and cerebral vascular accident, peripheral artery occlusive diseases, thromboembolic disease, stent	12

				revascularization .			thrombosis, cardiogenic shock, left ventricular ejection fraction <40%, or acute ST-segment elevation myocardial infarction within 48 h after onset of symptoms were excluded. In addition, patients with a left main disease requiring percutaneous coronary intervention (PCI), bifurcation lesions treated with a 2-stent technique, chronic total occlusions, and a history of PCI with DES were excluded.	
Tan et al. 2015	123	Single- center	First generation	Incidence of a major adverse cardiac event (MACE), defined as death, non-fatal myocardial infarction, and target lesion revascularization (TLR)	The safety endpoint was stent thrombosis. It was defined as definite or probable stent thrombosis according to established criteria.	Consecutive elderly patients (age >70) with the unprotected left main coronary artery (ULMCA) defined as at least 50% stenosis by visual assessment in the LM vessel without bypass grafts to the left anterior descending artery or left circumflex artery	Exclusion criteria were severe left ventricular dysfunction (ejection fraction <30%), cardiogenic shock, acute myocardial infarction, and carcinoma.	24
ULTIMATE 2021	1448	Multi-center	Second generation	Target-vessel failure (TVF) at12 months, including cardiac death, target-vessel myocardial infarction, and clinically driven target-vessel revascularization (TVR	All-cause death, MI, TLR, ISR, stroke, and each individual component of the primary endpoint. The safety endpoint was ST, according to the definition by the Academic Research Consortium	Patients who had silent ischemia, stable or unstable angina, or myocardial infarction(MI) (including both ST-segment elevation and non–ST-segment elevation MI)>24 h from the onset of chest pain to admission, and a de novo coronary lesion eligible for DES	Comorbidity with a life expectancy<12 months; intolerant of antithrombotic therapy; significant anemia, thrombocytopenia, or leucopenia; history of major hemorrhage (intracranial, gastrointestinal, and so on); 5) chronic total occlusion lesion in either the left anterior descending coronary artery, or left circumflex artery or right coronary artery not	36

						implantation	recanalized; and severe calcification needing rotational atherectomy. Operators who had yearly percutaneous coronary intervention (PCI) cases<200 were also blocked from participating in this study	
Wang et al. 2014	80	Single- center	Not reported	Major adverse cardiac event (MACE) experienced by the patients during hospitalization (2–3 weeks) and at 1, 3, 6, and 12 months postoperatively, including cardiac death, recur-rent myocardial infarction, target vascular reconstruction, and intractable myocardial ischemia.	Changes in the left ventricular end-diastolic diameter (LVEDD) and left-ventricular ejection fraction (LVEF)	Presentation of STEMI within 12 h of symptom onset and compliance with the WHO diagnosis criteria for STEMI in patients with primary acute myocardial infarction (AMI); preprocedural TIMI grade 0/1flow or thrombus grad≥3 in the IRA (angiographic inclusion criterion); and presence of a critical lesion defined as 50–75% residual stenosis after aspiration thrombectomy and a TIMI grade 3flow at the distal end of the IRA	residual stenosis>75% or thrombolysis in myocardial infarction (TIMI) grade< 3 flow after aspiration thrombectomy; more than 2 stents inserted; left main coronary artery occlusion; hemodynamic instability requiring hemodynamic support devices; old myocardial infarction; prior cardiopulmonary resuscitation; hepatic and renal dysfunction or neoplastic dis-ease, valvular heart disease, congenital heart dis-ease, or cardiomyopathy; patients undergoing coronary angioplasty or coronary artery bypass graft; patients with coagulation disorders; no tolerance for aspirin and clopidogrel; and heparin and contrast medium allergies	12
Liu et al. 2019	336	Single- center	Not reported	Incidence of composite major adverse cardiac events (MACEs), including cardiac death, myocardial infarction (MI), and target vessel	Risk of stent thrombosis (ST) was chosen as the safety endpoint.	Adult patients with ULMCA lesions and planned for receiving DES implantation (age from 18 to 75 years) and good compliance with antiplatelet therapy post-PCI.	Acute myocardial infarction (MI) (≤24 h); cardiogenic shock; high-risk factors for bleeding, such as dysfunction of blood coagulation or histories of major hemorrhage (e.g., intracranial or gastrointestinal); and renal or hepatic failure or carcinoma	12

				revascularization (TVR)			were excluded from the study. Patients with a chronic total occlusion (CTO) in the left anterior descending (LAD) artery or left circumflex (LCx) artery with no access to successful recanalization before randomization or complicated with severe calcification needing rotational atherectomy were also excluded.	
Optical Coherence Tomography vs. Angiography-guided Percutaneous Coronary Intervention								
OCTACS 2015	100	Single-center	Third generation	The primary end point of the study was the difference in percentage of uncovered struts in the OCT-guided versus the angio-guided group at 6-month follow-up.	Secondary end points were differences between treatment groups in (1) percentage of acutely malapposed struts at baseline, (2) percentage of malapposed struts at 6-month follow-up, and (3) percentage of struts being both malapposed and uncovered at 6-month follow-up.	Patients were eligible for participation in the trial if they were (1) ≥18 and <80 years of age, (2) a NSTEMI had been diagnosed, (3) a de novo culprit lesion (≥50% diameter stenosis) in the coronary arteries had been visually identified on coronary angiography, and (4) percutaneous coronary intervention (PCI) with stent implantation was indicated.	Exclusion criteria comprised (1) left main disease, (2) extremely narrowed, calcified or tortuous culprit vessels unsuitable for intravascular imaging, (3) long lesions (>45 mm) because of the limited pullback length of the OCT system, (4) bifurcation lesions, (5) reference vessel diameter(s) >3.5 mm, (6) life expectancy <12 months, and (7) plasma creatinine >170 µmol/L.	6
DOCTORS 2016	240	Multi-center	Not reported	Fractional flow reserve (FFR) measured at the end of the procedure.	Procedural complications defined as occurrence of any one or more of the following: Presence of no reflow, coronary perforation, occlusive dissection, spasm, or stent occlusion. Periprocedural (type 4a) myocardial	Patients aged 18 to 80 years inclusive, admitted for ACS with the following symptoms: Clinical signs of ischemia (chest pain) at rest lasting for at least 10 minutes in the	Left main disease; in-stent restenosis; presence of coronary artery bypass grafts; Cardiogenic shock or severe hemodynamic instability; severely calcified or tortuous arteries; persistent ST-segment elevation; 1 or more other lesions considered	6

					infarction (MI) as defined by the Third Universal Definition of Myocardial Infarction. Identification of a threshold value for quantitative OCT findings that best predicts an FFR value >0.90. Safety end points were: 1) Acute kidney injury defined as an absolute increase in serum creatinine of≥0.5 mg/dL frombaseline.112) Duration of the procedure, fluoroscopy time, quantity of contrast media used, and radiation dose delivered.	previous 72 hours; and at least 1 of the following 2 criteria: (i) New ST segment depres-sion≥1 mm or transitory ST-segment elevation (<30 minutes;≥1 mm) on at least 2 contiguous leads of the electrocardiogram; or (ii) elevation (>upper limit of normal, ULN) of cardiac enzymes (CK-MB, troponin I or T); and presenting an indication for coronary angioplasty with stent implantation of the target lesion (single lesion on the culprit artery without diffuse disease on the same vessel) considered to be responsible for the ACS.	angiographically significant, or nonsignificant diffuse disease, located on the target vessel; severe renal insufficiency (estimated glomerular filtration rate (eGFR)≤30mL/min); bacteremia or septicemia; severe coagulation disorders; pregnancy; refusal to sign the informed consent form.	
ROBUST 2018	201	Multi-center	Second/ New generation	Major adverse cardiovascular events (MACE; including death, myocardial infarction [MI], and target lesion revascularization [TLR]) were assessed.	Not reported	Patients between 18 and 85 years of age admitted with STEMI (without cardiogenic shock, left main disease and ostial lesion) in a native coronary artery (diameter range 2.5–3.75 mm) with a lesion suitable for stenting were included.	Patients with cardiogenic shock, left main disease or ostial lesion.	9
OPTIMUM 2020	110	Multi-center	New generation	Average postprocedural	In the entire main branch, 1) frequency of malposed	Presence of de novo, native, previously	Pregnancy. Known intolerance to aspirin, clopidogrel,	12

				percentage of malposed struts per lesion assessed by OFDI in the main branch of the bifurcation, which was calculated for each treated lesion as the ratio of the malposed struts to the total number of struts in the bifurcation region.	struts, 2) incomplete stent apposition (ISA) area, 3) minimum/mean lumen area, 4) minimum/mean stent area, 5) mean/ maximum protrusion area, 6) mean/ maximum intra-stent defect attached to/ free from the vessel wall and 7) minimum/mean flow area. In the bifurcation region: 1) incidence of fulfilling optimal 3 recrossing criteria on 3D-OFDI, 2) ISA area, 3) minimum/mean lumen area, 4) minimum/mean stent area, 5) mean/ maximum protrusion area, 6) mean/ maximum intra-stent defect attached to/ free from the vessel wall and 7) minimum/mean flow area. Intra-stent defect attached to the wall is defined as an irregular-shaped tissue attached to the luminal surface and Intra-stent defect free from the wall defined as an isolated structure in the lumen distant from the vessel wall.	unstented bifurcation lesion(s) with an SB diameter of≥2.0 mm (by visual estimation) to be treated by PCI with a single stent strategy.	heparin, cobalt chromium, sirolimus, contrast material. Known thrombocytopenia (platelet count< 100,000/mm^3. Contraindications to PCI, stenting, ASA, clopidogrel, prasugrel or ticagrelor. Cardiogenic Shock. Significant comorbidities precluding clinical follow-up (as judged by investigators). Major planned surgery that requires discontinuation of dual antiplatelet therapy. History of stenting in the target bifurcation lesion. Renal insufficiency (GFR/MDRD < 2.25 and > 4 mm. Target bifurcation lesion has a previously implanted stent.	
ILUMIEN IV: OPTIMIZE PCI 2023	2487	Multi-center	Second generation	The primary imaging end point was the final minimum stent area after PCI as assessed	The major secondary end point was target-vessel failure, excluding periprocedural myocardial infarction.	Patients who were undergoing PCI were eligible for enrollment if they were 18 years of age or older, had evidence of	STEMI ≤24 hours from the onset of ischemic symptoms 9 2. Creatinine clearance ≤30 ml/min/1.73 m2 (as calculated by MDRD formula for estimated GFR)1 and not on	24

				with OCT. The primary clinical end point was target-vessel failure at 2 years, defined as a composite of death from cardiac causes, target-vessel myocardial infarction, or ischemia-driven target-vessel revascularization.		myocardial ischemia, and were considered to be at high risk or had high-risk coronary-artery lesions. A high-risk patient was defined as a patient with diabetes mellitus that was being treated with medication. A high-risk coronary-artery lesion was defined as a lesion that was considered to be responsible for a recent myocardial infarction, long or multiple lesions warranting treatment with more than 28 mm of stent, a bifurcation lesion for which treatment would warrant the implantation of two stents, a severely calcified lesion, a chronic total occlusion, or diffuse or multifocal in-stent restenosis.	dialysis. Note: chronic dialysis dependent patients are eligible for enrolment regardless of creatinine clearance. 3. Hypotension, shock or need for mechanical support or intravenous vasopressors at the time the patient would be undergoing the index procedure. 4. CHF (Killip class ≥2 or NYHA class ≥3) 5. LVEF ≤30% by the most recent imaging test within 3 months prior to procedure. If no LVEF test result within 3 months is available, it must be assessed by echocardiography, multiple gated acquisition (MUGA), magnetic resonance imaging (MRI), ventriculography (LV gram) or other method. 6. Unstable ventricular arrhythmias 7. Inability to take DAPT (both aspirin and a P2Y12 inhibitor) for at least 12 months in the patient presenting with an ACS, or at least 6 months in the patient presenting with stable CAD, unless the patient is also taking chronic oral anticoagulation in which case a shorter duration of DAPT may be prescribed per local standard of care. 8. Planned major cardiac or non-cardiac surgery within 24 months after the index procedure.	
OCTOBER 2023	1201	Multi-center	Second generation	The primary end point was a	Death from a cardiac cause; target-lesion	Eligible patients were at least 18 years of age	Patients were excluded if they had had an ST-elevation	24

				composite of major adverse cardiac events (MACE), defined as death from a cardiac cause, target-lesion myocardial infarction, or ischemia-driven target-lesion revascularization at a median follow-up of 2 years	myocardial infarction; target-lesion revascularization; a bifurcation lesion–oriented composite end point of death from a cardiac cause, target lesion myocardial infarction, or target lesion revascularization; and a patient-oriented composite end point of death from any cause, myocardial infarction, any coronary revascularization, or stroke.	and had stable angina, unstable angina, or a non–ST-segment-elevation myocardial infarction; had a clinical indication for PCI; and had a coronary-artery bifurcation lesion that was revealed on coronary angiography.	myocardial infarction within 72 hours before randomization; were in a state of cardiogenic shock; had undergone previous coronary-artery bypass grafting to a target vessel, or the procedure was planned; or had an estimated glomerular filtration rate of less than 50 ml per minute per 1.73 m^2, an expected survival of less than 2 years, a left ventricular ejection fraction of less than 30%, or heart failure symptoms more serious than New York Heart Association class II. Key angiographic exclusion criteria were severe tortuosity of the coronary artery at the target bifurcation lesion, the presence of a chronic total occlusion, or a large thrombus in the left main coronary artery	
Intravascular Ultrasound and Optical Coherence Tomography vs. Angiography-guided Percutaneous Coronary Intervention								
RENOVATE-COMPLEX-PCI 2023	1639	Multi-center	New generation	Composite of death from cardiac causes, target-vessel–related myocardial infarction, or clinically driven target-vessel revascularization	Target-vessel failure without procedure-related myocardial infarction, a composite of target-vessel–related myocardial infarction or death from cardiac causes, and definite stent thrombosis	Patients 19 years of age or older who were undergoing PCI for complex coronary-artery lesions. Complex coronary-artery lesions were defined as true bifurcation lesions according to the Medina classification system with a side-branch diameter of at least 2.5 mm; a	Patients with coronary lesion not appropriate candidates for PCI as determined by the operator, cardiogenic shock (Killip class IV) at presentation, or a known hypersensitivity or a contra-indication to aspirin, clopidogrel, prasugrel, ticagrelor, heparin, everolimus, or contrast medium or if they were pregnant or breast-feeding	24

						chronic total occlusion; unprotected left main coronary artery disease; long coronary-artery lesions that would involve unexpected stent length of at least 38 mm; multi-vessel PCI involving at least two major epicardial coronary arteries being treated at the same time; a lesion that would necessitate the use of multiple stents (at least three planned stents); a lesion involving in-stent restenosis; a severely calcified lesion; or ostial lesions of a major epicardial coronary artery		
ILUMIEN III: OPTIMIZE PCI 2021	450	Multi-center	Not reported	Primary imaging-based outcome was the final minimal stent area (MSA) on optical coherence tomography (OCT). Target lesion failure (TLF), a composite of cardiac death, target vessel MI, or ischemia-	Secondary imaging-based outcomes (including acute procedural success, defined as the percentage of patients achieving optimal [≥95%] or acceptable [90% to <95%] stent expansion; minimum stent expansion; mean stent expansion; tissue or thrombus protrusion; untreated reference segment disease; dissections; and stent malposition.	Eligible patients had one or more target lesions located in a native coronary artery with a visually estimated reference vessel diameter (by angiography) of 2.25-3.50 mm and a length of <40 mm.	Patients with left main or ostial right coronary artery stenoses, bypass graft stenoses, chronic total occlusions, planned two-stent bifurcations, and in-stent restenosis were excluded	12

				driven tar-get lesion revascularization and MACE, a composite of death, MI, stent thrombosis, or repeat revascularization , were clinical endpoints adjudicated by a clinical events committee blinded to treatment assignment up to 12-month follow-up.				
iSIGHT 2021	156	Single-center	Second/ New generation	Noninferiority of post procedure stent expansion (defined as minimal stent area (MSA) divided by the average lumen area of the distal and proximal references).	Superiority testing of stent expansion among the groups and comparison of mean and minimum stent areas, mean and minimum in-stent lumen areas, stent eccentricity, mean and minimum stent diameters, plaque prolapse area, incomplete stent apposition, stent edge dissections, and the circumferential arc of visible external elastic membrane (EEM) at the vessel references.	Patients ≥18 years old scheduled for PCI of native coronary arteries were eligible for inclusion. We enrolled patients with stable angina, non–ST-segment–elevation acute coronary syndromes, or ST-segment–elevation myocardial infarction (MI) within≥48 hours from the initial presentation. Eligible patients could have ≥1 target lesion in ≥1 native coronary with a reference diameter ranging from 2.25 to 4.0 mm by visual	Cardiogenic shock or with signs of congestive heart failure, chronic kidney disease with an estimated glomerular filtration rate ≤45 mL/(min·1.73 m^2), significant (≥50%) stenosis in the left main stem, aorto-ostial lesions, chronic total occlusions, bifurcation lesions in which 2-stent strategy was anticipated, and lesions in arterial or venous grafts.	30

		estimation. The use of ≥1 stent was allowed for complete lesion coverage.

Supplementary Table E: Procedural and angiographic characteristics of patients in the included trials.

Trial	Stent diameter (mm)	Stent length (mm)	Max. balloon diameter (mm)	Max post-dilation pressure (ATM)	Contrast volume (ml)	Lesion length (mm)	Reference vessel diameter (mm)	Pre MLD (mm)	Post MLD (mm)	Pre-DS (%)	Post-DS (%)	Multi-vessel disease (%)
IVUS vs. angiography-guided PCI												
HOME DES IVUS 2009	-	23.6/22.1	3.3/3.1	16.4/15.2	133/113	18.1/17.6	3.2/3.0	1.1/1.0	2.9/2.9	82.3/79.2	14.6/15.3	60/54
RESET 2013	-	33/31	3.2/3.1	13.4/13.6	-	29.8/30.5	2.8/2.8	1.0/0.9	2.6/2.5	-	-	38/41
AVIO 2013	3.0/2.9	23.9/23.2	3.4/3.2	20.3/19.6	-	27.4/25.5	2.7/2.6	0.8/0.7	2.6/2.4	71.6/75.5	13.9/15.5	-
Wang et al. 2014	-	-	-	-	-	-	-	-	-	-	-	-
MOZART 2014	3.0/3.0	32/33	-	-	20/ 65	-	-	-	-	-	-	-
AIR CTO 2015	3.1/2.9	55/52	-	-	293/293	29.0/30.6	2.7/2.6	-	3.0/2.9	100/100	7.5/8.2	49/57
CTO-IVUS 2015	2.9/2.9	43.6/41.5	-	14.6/13.8	299/295	36.3/35.5	2.7/2.6	-	2.6/2.6	100/100	9.0/0.2	72/63
IVUS-XPL 2020	-	39.3/39.2	3.1/3.0	16.5/15.9	-	34.7/35.2	2.9/2.9	0.8/0.8	2.6/2.6	71.1/71.4	12.8/13.7	68/70
Tan et al. 2015	3.4/3.4	21.5/18.2	-	-	-	-	-	1.9/1.9	3.4/3.4	-	-	93/84
Liu et al. 2019	3.5/3.3	32.6/33.3	3.5/3.5	15.4/13.9	-	-	-	-	-	-	-	83/85
ULTIMATE 2021	3.1/3.0	50.0/47.4	3.7/3.5	19.7/19.0	178/162	35.1/34.1	2.7/2.8	-	-	-	-	53/57
OCT vs. angiography-guided PCI												
OCTACS 2015	3.0/3.0	22.6/20.1	3.3/3.2	16.8/15.0	150/110	16.6/14.7	3.0/3.0	-	-	-	-	-
DOCTORS 2016	-	-	-	-	-	13.7/13.5	2.8/2.9	0.8/0.9	2.9/2.9	71.3/69.3	7.0/8.7	35/27
ROBUST 2018	-	-	-	18/16	230/168	-	-	0.3/0.5	2.8/2.9	92/87	12/12	12/9
OPTIMUM 2020	2.8/2.7	30.0/28.8	3.3/3.3	13.6/13.9	183/185	-	PMV-2.7/2.9	-	-	PMV-	PMV-	-

							DMV-2.2/2.2			34.2/35.1 DMV-46.9/44.5	12.1/10.3 DMV-11.1/11.2	
ILUMIEN IV: OPTIMIZE PCI 2023	3.2/3.11	44.2/40.5	-	19.8/18.4	232/198	32.9/29.9	2.93/2.90	0.88/0.88	2.97/2.93	69.8/69.6	10.8/10.9	-
OCTOBER 2023	-	23/23	4.1/4.2	-	300/200	PMV-20.5/19.6, SB-8.7/9.1	PMV-3.3/3.3, SB-2.5/2.5	-	PMV-3.1/3.1, SB-1.9/1.9	PMV-45.2/41.9, SB-52.5/50.9	PMV-10.9/10.8, SB-26.4/27.1	100/100
IVUS vs. OCT vs. angiography-guided PCI												
iSIGHT 2021	3.3/3.3/3.2	32.5/28.6/25.8	3.5/3.5/3.5	20/20/24	-	23.1/21.6/20.2	2.9/2.8/2.9	0.8/0.8/0.8	3.3/3.3/3.3	71.4/73.0/71.3	-	-
ILUMIEN III: OPTIMIZE PCI 2021	-	24/23/20	3.5/3.5/3.0	19/18/18	196/225/183	15.3/15.3/14.7	2.9/2.8/2.8	1.1/1.0/1.0	-	63.3/64.0/65.4	-	-
RENOVATE-COMPLEX-PCI 2023	3.1/3.0	38.0/36.9	-	-	314/194	28.4/26.8	3.2/3.1	0.44/0.44	2.8/2.7	85.4/85.2	9.8/10.0	68/69

IVUS: intravascular ultrasound; PCI: percutaneous coronary intervention; OCT: optical coherence tomography; MLD: minimal lumen diameter; DS: diameter stenosis; PMV: proximal main vessel; DMV: distal main vessel; SB: side branch

Supplementary Table F: Definition of complex lesion in the included trials.

IVUS vs. angiography-guided PCI	
HOME DES IVUS 2009	Lesion type B2and C according to the American Heart Association, proximal left anterior descending artery, left main disease, reference vessel diameter<2.5 mm, lesion length>20 mm, in-stent restenosis, insulin dependent diabetes, acute coronary syndrome
RESET 2013	De novo lesion requiring a stent ≥28 mm in length in a vessel with a distal reference diameter ≥2.5 mm by visual angiographic estimation
AVIO 2013	Long lesions (>28 mm); chronic total occlusions (CTO), i.e., a total occlusion of duration more than 3-months; lesions involving a bifurcation; small vessels (≤2.5mm) and patients requiring 4 or more stents.
AIR CTO 2015	Chronic total occlusion i.e., a total occlusion of duration more than 3-months
CTO-IVUS 2015	Chronic total occlusion i.e., a total occlusion of duration more than 3-months
IVUS-XPL 2020	Long coronary lesions (implanted stent≥28 mm in length) were indicated based on angiographic estimation
Tan et al. 2015	Unprotected left main coronary artery was defined as at least 50% stenosis by visual assessment in the left main vessel without bypass grafts to the left anterior descending artery or left circumflex artery
Liu et al. 2019	Unprotected left main coronary artery was defined as at least 50% stenosis by visual assessment
OCT vs. angiography-guided PCI	
OPTIMUM 2020	Bifurcation lesion(s) with a side branch diameter of≥2.0 mm (by visual estimation)
ILUMIEN IV: OPTIMIZE PCI 2023	A high-risk patient was defined as a patient with diabetes mellitus that was being treated with medication. A high-risk coronary-artery lesion was defined as a lesion that was considered to be responsible for a recent myocardial infarction, long or multiple lesions warranting treatment with more than 28 mm of stent, a bifurcation lesion for which treatment would warrant the implantation of two stents, a severely calcified lesion, a chronic total occlusion, or diffuse or multifocal in-stent restenosis.
OCTOBER 2023	Coronary-artery bifurcation lesion on coronary angiography. Eligible bifurcation lesions had a main branch reference diameter of at least 2.75 mm and stenosis of at least 50% by visual estimation. The side branch had to have a reference diameter of at least 2.5 mm and stenosis of at least 50% within 5 mm from the ostium of the side branch by visual estimation.
IVUS and OCT vs. angiography-guided PCI	
RENOVATE-COMPLEX-PCI 2023	True bifurcation lesions according to the Medina classification system with a side-branch diameter of at least 2.5 mm; a chronic total occlusion; unprotected left main coronary artery disease; long coronary artery lesions that would involve an expected stent length of at least 38 mm; multi-vessel PCI involving at least two major epicardial coronary arteries being treated at the same time; a lesion that would necessitate the use of multiple stents (at least three planned stents); a lesion involving in-stent restenosis; a severely calcified lesion; or ostial lesions of a major epicardial coronary artery

Supplementary Table G. Anticipated absolute risk differences (ARD) per 1000 persons with 95% confidence intervals (CI) of intravascular imaging on outcomes in patients undergoing percutaneous coronary intervention using the SYNTAX II score at 5 years.

Risk categories	**Rate ratio (95% CI)**	**Baseline risk for coronary angiography-guided PCI**	**ARD with intravascular imaging-guided PCI per 1000 persons (95% CI)**	**Certainty of evidence (GRADE)**
Cardiac death	0.53 (0.39-0.72)	28 per 1000	13 fewer (17 fewer to 8 fewer)	⊕⊕⊕⊕ (High)
Myocardial infarction	0.81 (0.68-0.97)	27 per 1000	5 fewer (9 fewer to 1 fewer)	⊕⊕⊕⊕ (High)
Stent thrombosis	0.44 (0.27-0.72)	14 per 1000	8 fewer (10 fewer to 4 fewer)	⊕⊕⊕⊕ (High)
Target vessel revascularization	0.74 (0.61-0.89)	63 per 1000	16 fewer (25 fewer to 7 fewer)	⊕⊕⊕⊕ (High)
Target lesion revascularization	0.71 (0.59-0.86)	55 per 1000	16 fewer (23 fewer to 8 fewer)	⊕⊕⊕⊕ (High)
All-cause death	0.81 (0.64-1.02)	81 per 1000	15 fewer (29 fewer to 2 more)	⊕⊕⊕◯ (Moderate)

Supplementary Table H. Subgroup analyses.

	No. of Trials (participants)	Cardiac death	MI	Stent thrombosis	TVR	TLR	All-cause death
Age, years							
<65	10 (3,693)	0.38 (0.17-0.86)	0.63 (0.38-1.05)	0.66 (0.26-1.67)	0.59 (0.34-1.02)	0.66 (0.48-0.92)	0.99 (0.43-2.27)
≥65	10 (8,005)	0.57 (0.38-0.86)	0.79 (0.57-1.08)	0.23 (0.09-0.59)	0.64 (0.49-0.86)	0.60 (0.44-0.82)	0.88 (0.64-1.22)
P-value		0.39	0.47	0.12	0.78	0.67	0.80
IV imaging							
IVUS	14 (6,863)	0.54 (0.35-0.84)	0.78 (0.57-1.06)	0.41 (0.20-0.84)	0.61 (0.46-0.82)	0.63 (0.49-0.80)	0.96 (0.65-1.42)
OCT	9 (5,560)	0.57 (0.32-1.01)	0.88 (0.69-1.12)	0.62 (0.25-1.57)	0.93 (0.70-1.23)	0.93 (0.68-1.27)	0.75 (0.52-1.07)
P-value		0.90	0.53	0.49	0.05	0.05	0.36
Setting							
ACS	4 (621)	-	1.94 (0.34-11.1)	-	0.81 (0.09-6.87)	1.83 (0.17-19.8)	3.00 (0.12-72.9)
All comers	16 (11,077)	-	0.73 (0.57-0.95)	-	0.63 (0.49-0.81)	0.62 (0.49-0.79)	0.89 (0.66-1.19)
P-value		-	0.28	-	0.82	0.38	0.46
Drug eluting stent							
First generation	3 (617)	0.50 (0.11-2.29)	0.69 (0.33-1.44)	0.67 (0.19-2.32)	0.20 (0.02-1.70)	0.42 (0.15-1.17)	1.50 (0.25-8.85)
Second generation	10 (9,863)	0.55 (0.36-0.84)	0.62 (0.43-0.90)	0.35 (0.13-0.93)	0.55 (0.39-0.76)	0.61 (0.47-0.80)	0.89 (0.65-1.23)
P-value		0.90	0.78	0.42	0.36	0.49	0.57
Sample size							
<500	14 (2,980)	0.42 (0.20-0.88)	0.86 (0.62-1.21)	0.43 (0.19-0.98)	0.59 (0.37-0.94)	0.72 (0.49-1.04)	0.99 (0.53-1.85)
≥500	6 (8,718)	0.56 (0.37-0.86)	0.62 (0.42-0.90)	0.33 (0.10-1.11)	0.65 (0.48-0.88)	0.58 (0.44-0.77)	0.88 (0.63-1.23)
P-value		0.49	0.20	0.73	0.73	0.40	0.73
Follow-up							
<1 year	4 (624)	-	0.89	-	2.00	1.82	0.73

			(0.19-4.15)		(0.19-21.5)	(0.17-19.7)	(0.05-10.5)
≥1 year	16 (11,074)	-	0.74 (0.57-0.96)	-	0.62 (0.49-0.82)	0.62 (0.50-0.78)	0.90 (0.67-1.20)
P-value		-	0.81	-	0.34	0.38	0.87

Supplementary Table I: Leave out study sensitivity analysis.

Study	Risk Ratio (95% Confidence Interval	P value	I^2 (%)
Cardiac death			
AVIO 2013	0.53 (0.37-0.77)	<0.01	0%
RESET 2013	0.53 (0.36-0.76)	<0.01	0%
OCTACS 2015	0.53 (0.39-0.73)	<0.01	0%
AIR CTO 2015	0.52 (0.35-0.76)	<0.01	0%
CTO-IVUS 2015	0.53 (0.37-0.77)	<0.01	0%
IVUS-XPL 2020	0.54 (0.36-0.81)	<0.01	0%
Tan et al. 2015	0.52 (0.36-0.76)	<0.01	0%
Liu et al. 2019	0.55 (0.38-0.81)	<0.01	0%
iSIGHT 2021	0.53 (0.36-0.76)	<0.01	0%
ULTIMATE 2021	0.44 (0.28-0.68)	<0.01	0%
RENOVATE-COMPLEX-PCI 2023	0.55 (0.35-0.85)	<0.01	0%
ILUMIEN IV: OPTIMIZE PCI 2023	0.52 (0.37-0.73)	<0.01	0%
OCTOBER 2023	0.53 (0.38-0.74)	<0.01	0%
Myocardial infarction			
HOME DES IVUS 2009	0.82 (0.69-0.98)	0.03	0%
AVIO 2013	0.81 (0.68-0.98)	0.03	0%
RESET 2013	0.82 (0.68-0.98)	0.03	0%
MOZART 2014	0.82 (0.68-0.98)	0.03	0%
Wang et al.	0.81 (0.68-0.97)	0.02	0%
AIR CTO 2015	0.78 (0.65-0.94)	<0.01	0%
CTO-IVUS 2015	0.82 (0.68-0.98)	0.03	0%
IVUS-XPL 2020	0.82 (0.68-0.98)	0.03	0%
Tan et al. 2015	0.80 (0.67-0.96)	0.02	0%
DOCTORS 2016	0.81 (0.66-0.97)	0.01	0%
ROBUST 2018	0.82 (0.68-0.98)	0.03	0%
Liu et al. 2019	0.83 (0.68-0.98)	0.03	0%
iSIGHT 2021	0.80 (0.67-0.97)	0.02	0%
ULTIMATE 2021	0.82 (0.68-0.98)	0.03	0%
RENOVATE-COMPLEX-PCI 2023	0.82 (0.68-0.96)	0.03	0%

ILUMIEN IV: OPTIMIZE PCI 2023	0.82 (0.66-0.99)	0.04	0%
OCTOBER 2023	0.76 (0.62-0.94)	0.01	0%
Target lesion revascularization			
HOME DES IVUS 2009	0.70 (0.58-0.85)	<0.01	0%
AVIO 2013	0.71 (0.58-0.86)	<0.01	0%
AIR CTO 2015	0.71 (0.59-0.86)	<0.01	0%
CTO-IVUS 2015	0.70 (0.59-0.86)	<0.01	0%
IVUS-XPL 2020	0.71 (0.58-0.86)	<0.01	0%
Tan et al. 2015	0.70 (0.59-0.87)	<0.01	0%
ROBUST 2018	0.69 (0.54-0.85)	<0.01	0%
Liu et al. 2019	0.71 (0.59-0.86)	<0.01	0%
ILUMIEN III: OPTIMIZE PCI 2021	0.70 (0.59-0.86)	<0.01	0%
iSIGHT 2021	0.71 (0.58-0.88)	<0.01	0%
ULTIMATE 2021	0.70 (0.57-0.86)	<0.01	0%
RENOVATE-COMPLEX-PCI 2023	0.71 (0.59-0.86)	<0.01	0%
ILUMIEN IV: OPTIMIZE PCI 2023	0.63 (0.51-0.78)	<0.01	0%
OCTOBER 2023	0.72 (0.59-0.87)	<0.01	0%
Target vessel revascularization			
AVIO 2013	0.74 (0.61-0.89)	<0.01	0%
RESET 2013	0.73 (0.58-0.82)	<0.01	0%
Wang et al. 2014	0.74 (0.60-0.84)	<0.01	0%
AIR CTO 2015	0.73 (0.58-0.82)	<0.01	0%
CTO-IVUS 2015	0.74 (0.60-0.85)	<0.01	0%
DOCTORS 2016	0.72 (0.58-0.88)	<0.01	0%
Liu et al. 2019	0.75 (0.60-0.84)	<0.01	0%
ILUMIEN III: OPTIMIZE PCI 2021	0.72 (0.58-0.79)	<0.01	0%
ULTIMATE 2021	0.72 (0.56-0.85)	<0.01	0%
RENOVATE-COMPLEX-PCI 2023	0.73 (0.57-0.84)	<0.01	0%
ILUMIEN IV: OPTIMIZE PCI 2023	0.64 (0.50-0.80)	<0.01	0%
OCTOBER 2023	0.75 (0.61-0.92)	<0.01	0%
Stent thrombosis			
HOME DES IVUS 2009	0.32 (0.15-0.70)	<0.01	0%
RESET 2013	0.37 (0.19-0.73)	<0.01	0%
OCTACS 2015	0.44 (0.27-0.73)	<0.01	0%

AIR CTO 2015	0.44 (0.22-0.88)	0.02	0%
CTO-IVUS 2015	0.41 (0.21-0.81)	0.01	0%
IVUS-XPL 2020	0.35 (0.17-0.70)	<0.01	0%
Liu et al. 2019	0.39 (0.19-0.80)	0.01	0%
ILUMIEN III: OPTIMIZE PCI 2021	0.37 (0.19-0.73)	<0.01	0%
ULTIMATE 2021	0.45 (0.2-0.89)	0.02	0%
RENOVATE-COMPLEX-PCI 2023	0.44 (0.22-0.88)	0.02	0%
ILUMIEN IV: OPTIMIZE PCI 2023	0.48 (0.27-0.85)	0.01	0%
OCTOBER 2023	0.38 (0.22-0.64)	<0.01	0%
All-cause death			
HOME DES IVUS 2009	0.80 (0.63-1.01)	0.06	0%
RESET 2013	0.80 (0.63-1.01)	0.06	0%
MOZART 2014	0.82 (0.65-1.03)	0.09	0%
AIR CTO 2015	0.81 (0.64-1.02)	0.08	0%
CTO-IVUS 2015	0.81 (0.64-1.02)	0.08	0%
DOCTORS 2016	0.80 (0.64-1.01)	0.06	0%
OPTIMUM 2020	0.80 (0.64-1.01)	0.06	0%
ILUMIEN III: OPTIMIZE PCI 2021	0.80 (0.64-1.01)	0.06	0%
iSIGHT 2021	0.81 (0.64-1.01)	0.07	0%
ULTIMATE 2021	0.76 (0.59-1.01)	0.06	0%
RENOVATE-COMPLEX-PCI 2023	0.83 (0.63-1.08)	0.16	0%
ILUMIEN IV: OPTIMIZE PCI 2023	0.83 (0.34-1.09)	0.19	0%
OCTOBER 2023	0.85 (0.66-1.09)	0.19	0%

Supplementary Table J. GRADE chart for the certainty of the evidence for effects of intravascular guided versus coronary angiography guided percutaneous coronary intervention for cardiovascular events.

Certainty assessment							Effect	Certainty	Importance
No. of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Absolute risk per 1000 (95% CI)**		
Cardiac death									
13	RCT	not serious	not serious [a]	not serious [b]	not serious [c]	none	10 fewer (13 fewer to 6 fewer)	⊕⊕⊕⊕ High	Critical
Myocardial infarction									
17	RCT	not serious	not serious [a]	not serious [b]	not serious [c]	none	9 fewer (15 fewer to 1 fewer)	⊕⊕⊕⊕ High	Critical
Stent thrombosis									
12	RCT	not serious	not serious [a]	not serious [b]	not serious [c]	none	7 fewer (9 fewer to 3 fewer)	⊕⊕⊕⊕ High	Critical
Target vessel revascularization									
12	RCT	not serious	not serious [a]	not serious [b]	not serious [c]	none	14 fewer (21 fewer to 6 fewer)	⊕⊕⊕⊕ High	Critical
Target lesion revascularization									
14	RCT	not serious	not serious [a]	not serious [b]	not serious [c]	none	18 fewer (25 fewer to 9 fewer)	⊕⊕⊕⊕ High	Critical
All-cause mortality									
13	RCT	not serious	not serious [a]	serious [b]	serious [c]	none	4 fewer (8 fewer to 0 fewer)	⊕⊕⊕◯ Moderate	Critical

RCT: Randomized controlled trials; CI: Confidence interval; RR: Rate ratio

Explanations

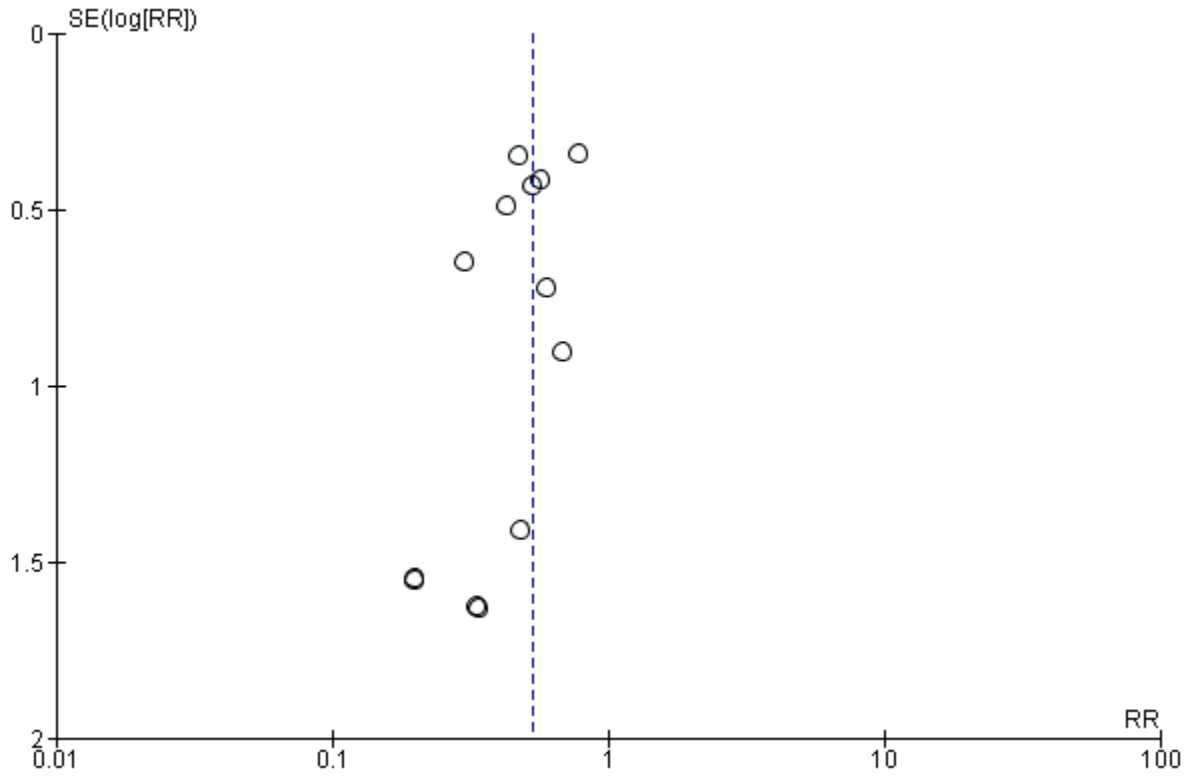
a. Criteria for evaluating consistency was based on the similarity of point estimates, the extent of overlap of confidence intervals, and statistical criteria, including tests of heterogeneity (I^2).

b. Indirectness was considered serious or very serious if cumulative evidence was derived from trials assessing interventions in participants with varying baseline cardiovascular risks and settings.

c. Imprecision was evaluated based on 95% confidence intervals' assessment overlap with the clinical benefit or harm.

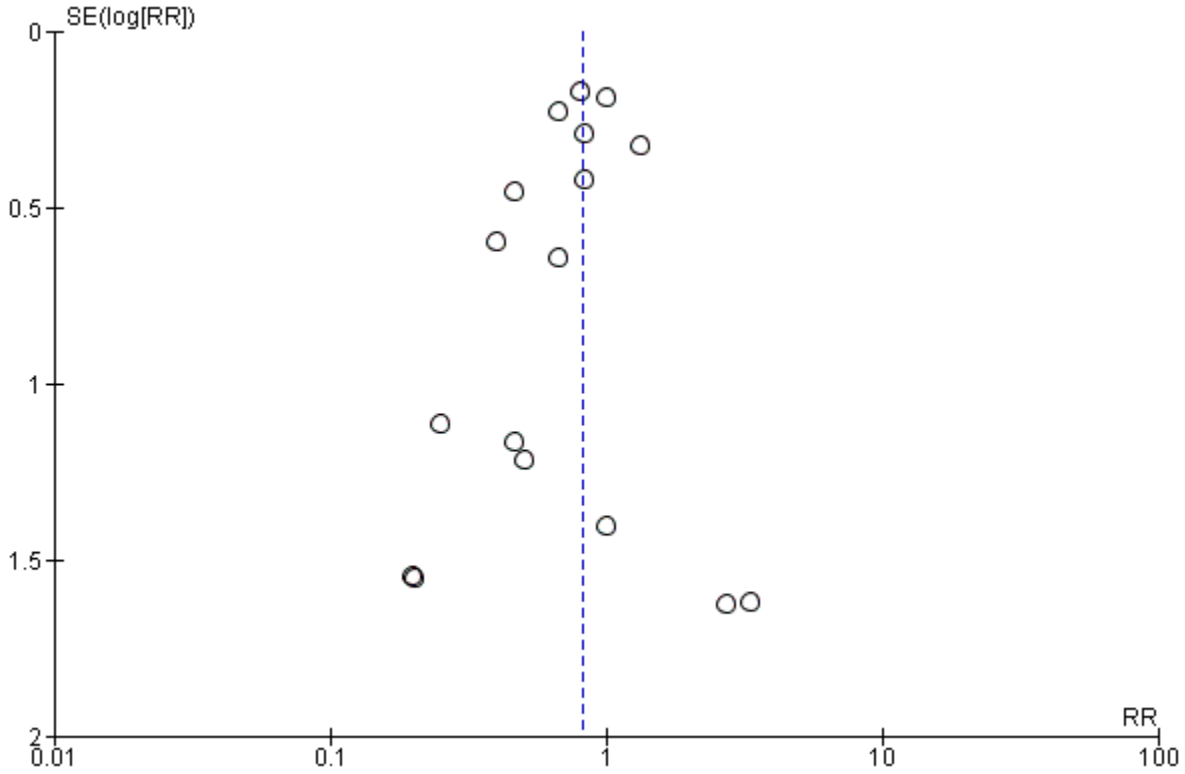
Supplementary Figure A: Assessement of risk of bias in the included trials.

Supplementary Figure B: Funnel plot for cardiac death between studies comparing intravascular imaging vs. conventional angiography guided percutaneous coronary intervention.



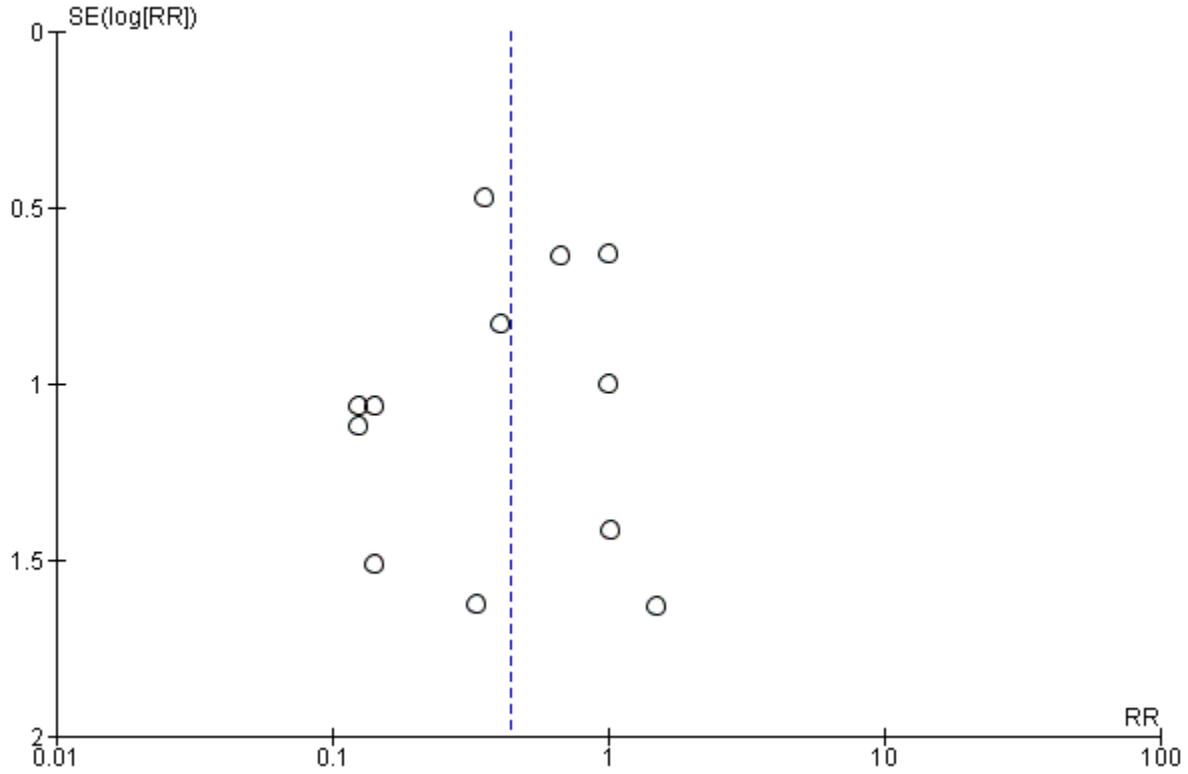
Egger's regression *P*-value (2-tailede): 0.13

Supplementary Figure C: Funnel plot for myocardial infarction between studies comparing intravascular imaging vs. conventional angiography guided percutaneous coronary intervention.



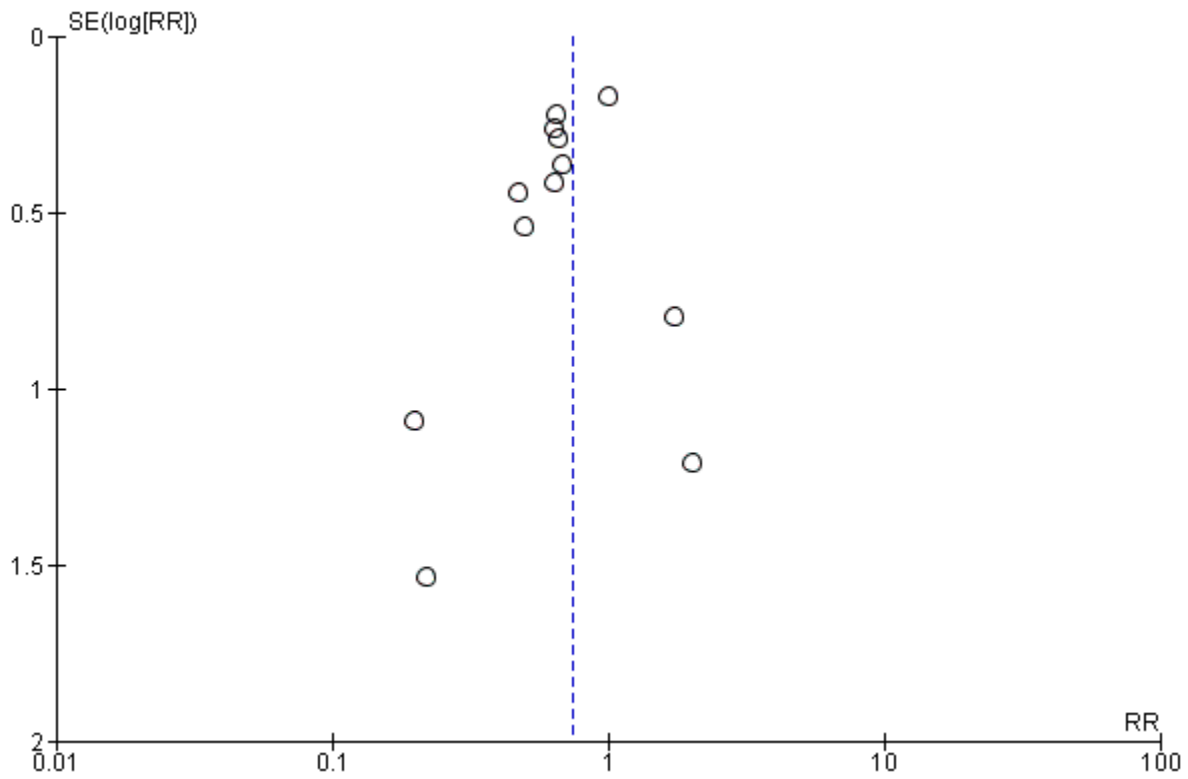
Egger's regression *P*-value (2-tailede): 0.43

Supplementary Figure D: Funnel plot for stent thrombosis between studies comparing intravascular imaging vs. conventional angiography guided percutaneous coronary intervention.



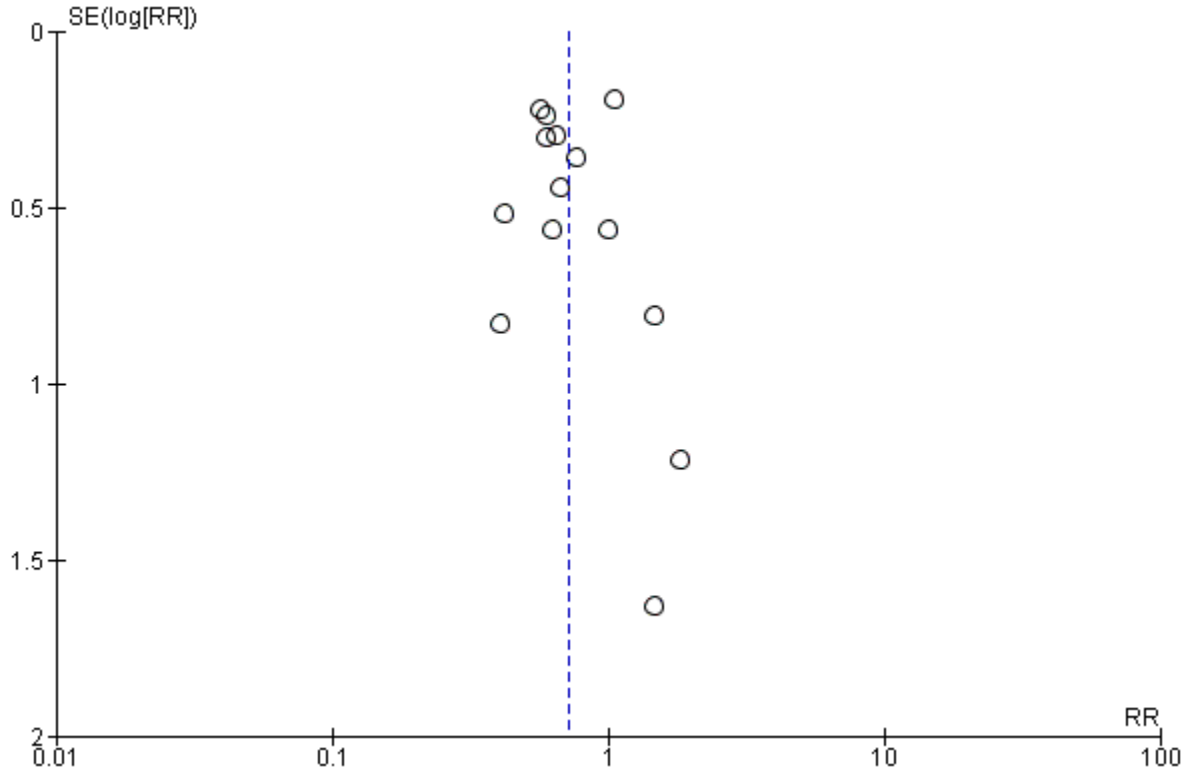
Egger's regression *P*-value (2-tailede): 0.61

Supplementary Figure E: Funnel plot for target vessel revacularization between studies comparing intravascular imaging vs. conventional angiography guided percutaneous coronary intervention.



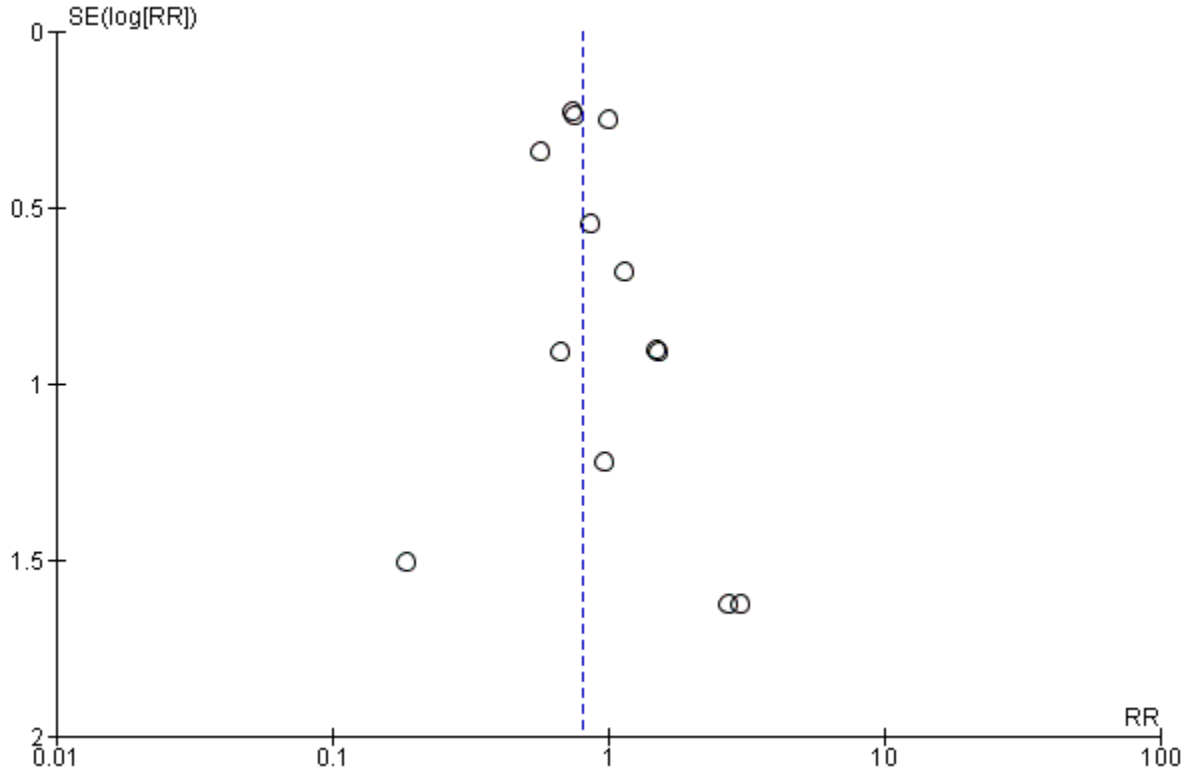
Egger's regression *P*-value (2-tailede): 0.85

Supplementary Figure F: Funnel plot for tareget lesion revascularization between studies comparing intravascular imaging vs. conventional angiography guided percutaneous coronary intervention.



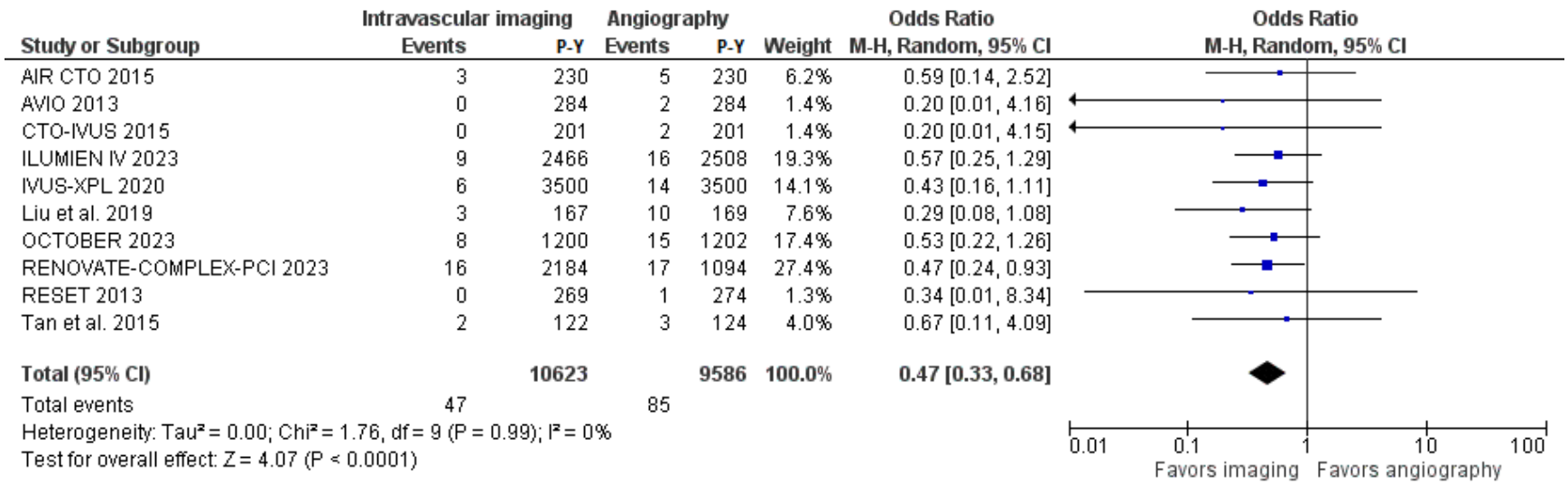
Egger's regression *P*-value (2-tailede): 0.07

Supplementary Figure G: Funnel plot for all-cause mortality between studies comparing intravascular imaging vs. conventional angiography guided percutaneous coronary intervention.

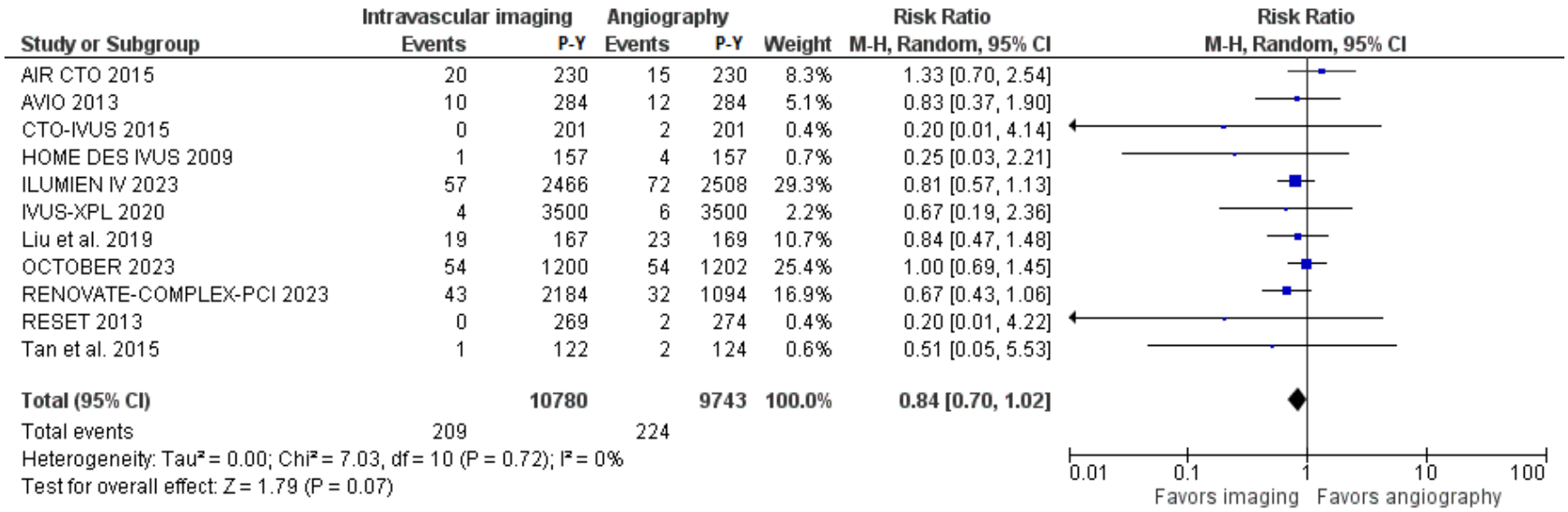


Egger's regression *P*-value (2-tailede): 0.35

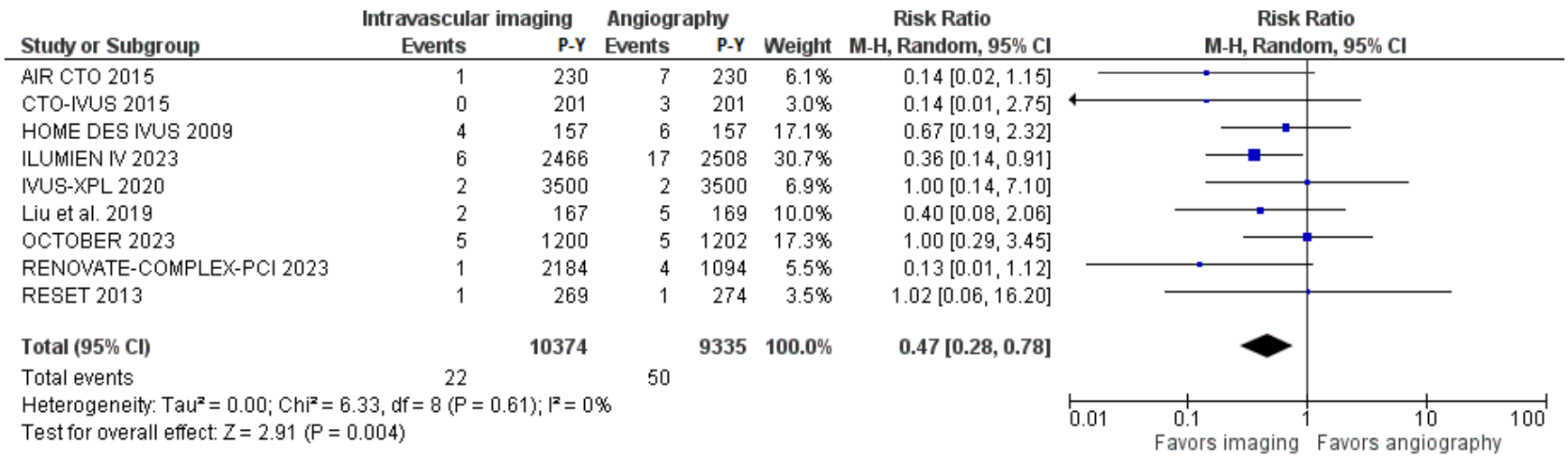
Supplementary Figure H: Forest plot for cardiac death in patients with complex coronary lesions undergoing intravascular imaging vs. conventional angiography guided percutaneous coronary intervention.



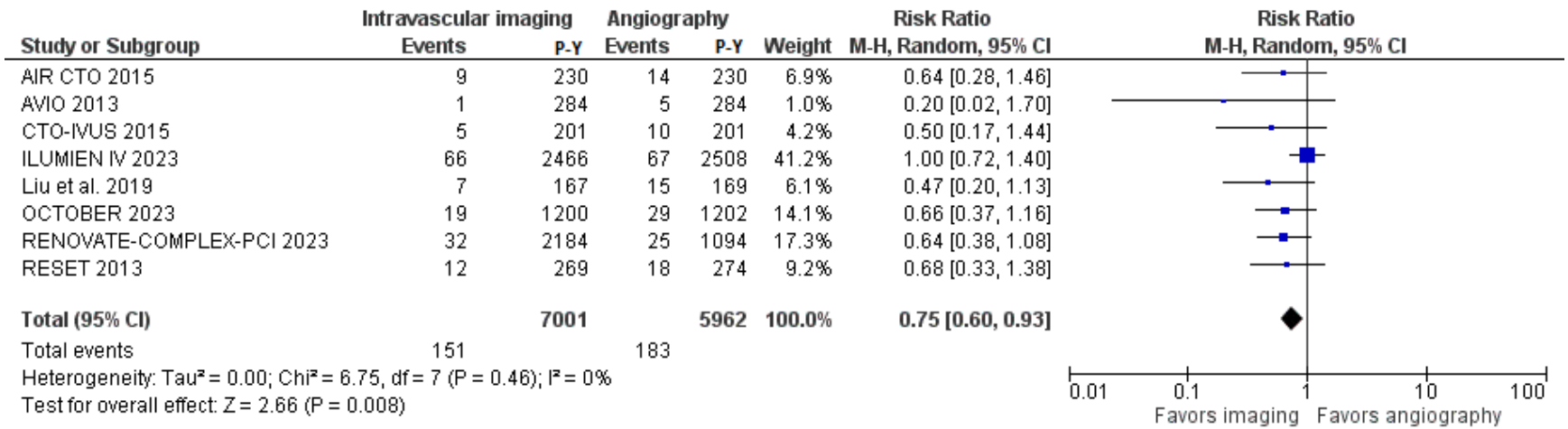
Supplementary Figure I: Forest plot for myocardiac infarction in patients with complex coronary lesions undergoing intravascular imaging vs. conventional angiography guided percutaneous coronary intervention.



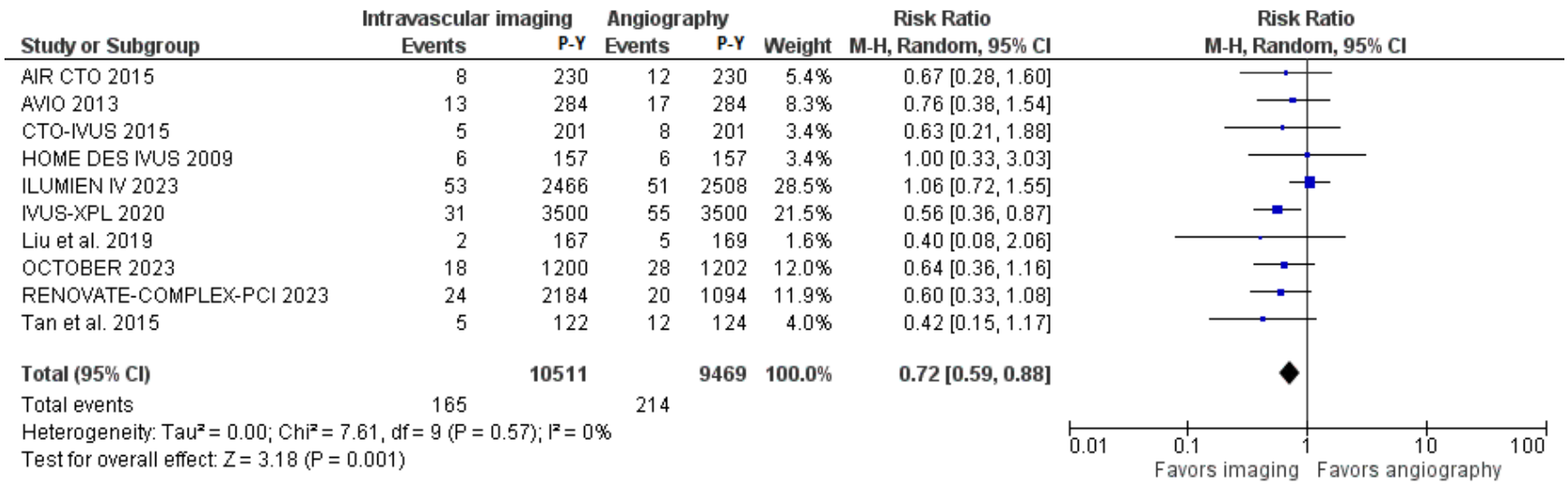
Supplementary Figure J: Forest plot for stent thrombosis in patients with complex coronary lesions undergoing intravascular imaging vs. conventional angiography guided percutaneous coronary intervention.



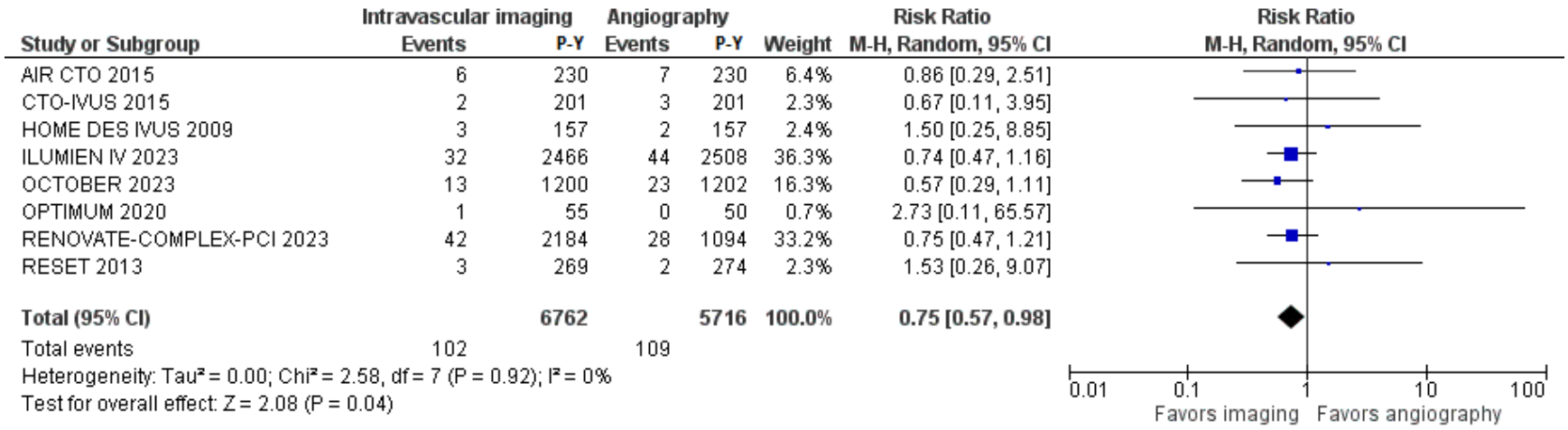
Supplementary Figure K: Forest plot for target vessel revascularization in patients with complex coronary lesions undergoing intravascular imaging vs. conventional angiography guided percutaneous coronary intervention.



Supplementary Figure L: Forest plot for target lesion revascularization in patients with complex coronary lesions undergoing intravascular imaging vs. conventional angiography guided percutaneous coronary intervention.



Supplementary Figure M: Forest plot for all-cause mortality in patients with complex coronary lesions undergoing intravascular imaging vs. conventional angiography guided percutaneous coronary intervention.



References

1. Furukawa TA, Guyatt GH, Griffith LE. Can we individualize the 'number needed to treat'? An empirical study of summary effect measures in meta-analyses. International journal of epidemiology 2002;31:72-6.
2. Deeks JJ. Issues in the selection of a summary statistic for meta-analysis of clinical trials with binary outcomes. Statistics in medicine 2002;21:1575-600.
3. Schmid CH, Lau J, McIntosh MW, Cappelleri JC. An empirical study of the effect of the control rate as a predictor of treatment efficacy in meta-analysis of clinical trials. Statistics in medicine 1998;17:1923-42.
4. Mohr FW, Morice MC, Kappetein AP et al. Coronary artery bypass graft surgery versus percutaneous coronary intervention in patients with three-vessel disease and left main coronary disease: 5-year follow-up of the randomised, clinical SYNTAX trial. Lancet (London, England) 2013;381:629-38.
5. Lee JM, Choi KH, Song YB et al. Intravascular Imaging-Guided or Angiography-Guided Complex PCI. The New England journal of medicine 2023.