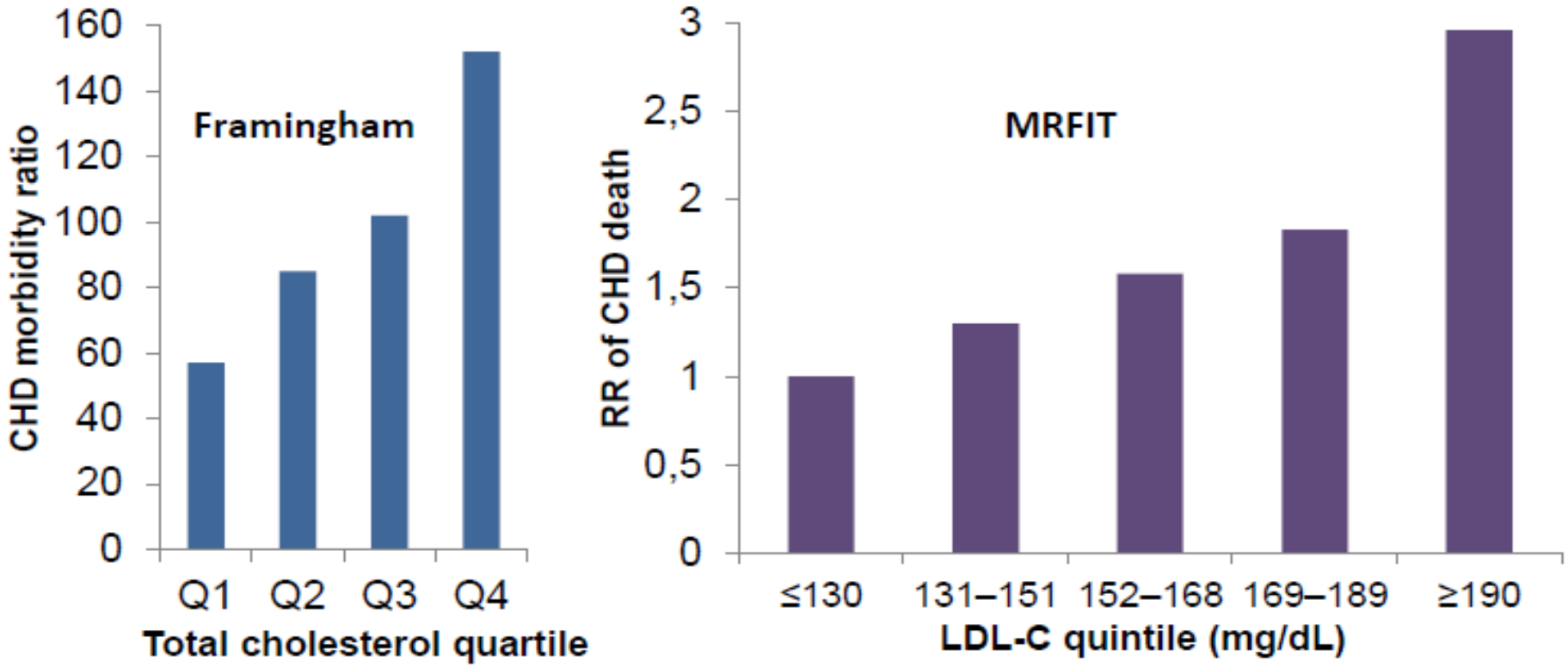
PCSK9 post-PCI: necessario o indispensabile?

Fortunato Scotto di Uccio

Cardiologia – UTIC Emodinamica
Ospedale del Mare ASL NA1

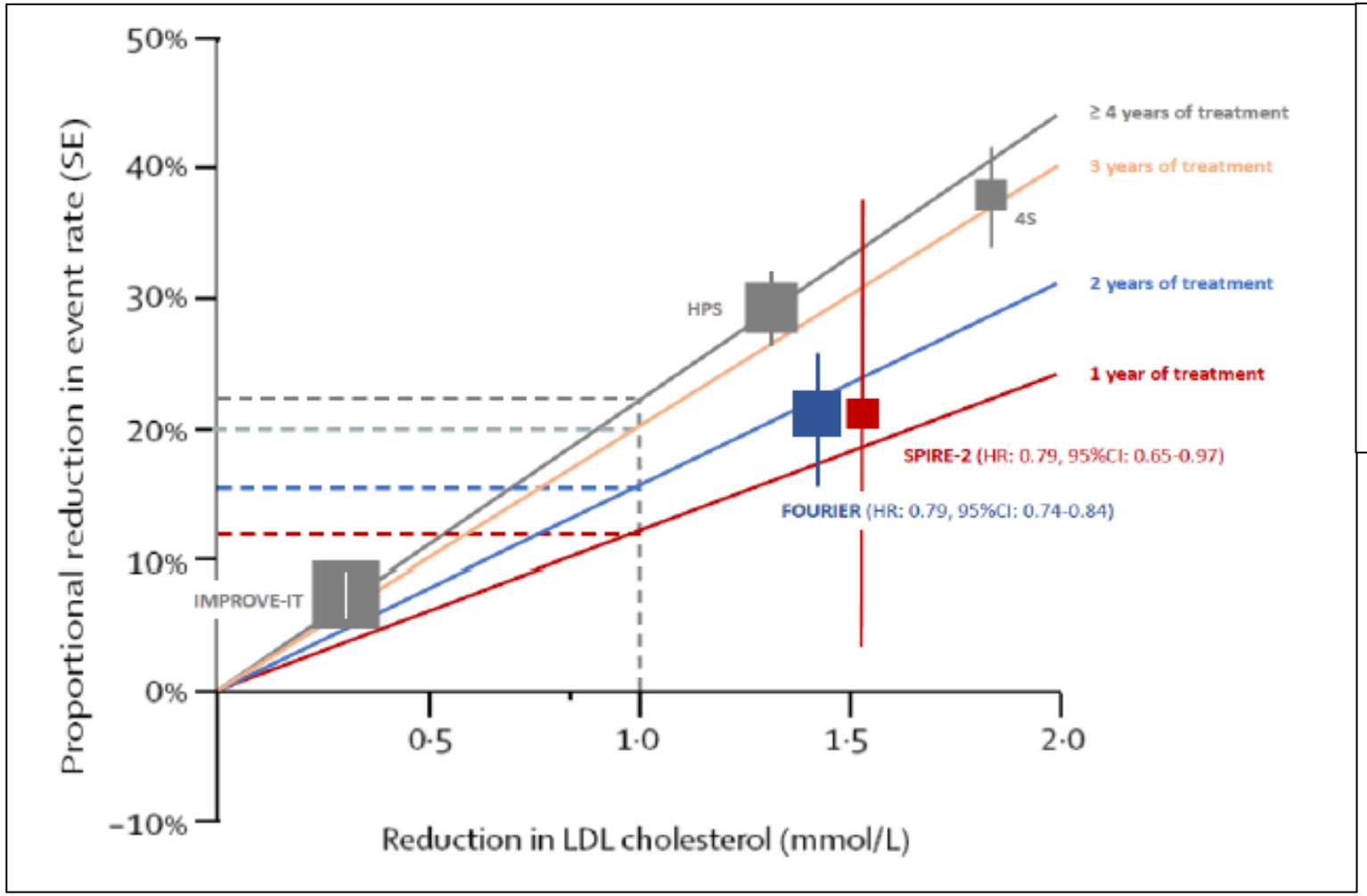
Higher LDL levels are associated with greater CV morbidity and mortality

In epidemiological studies, including the Framingham Heart Study[1] and MRFIT[2], high levels of cholesterol or LDL-C resulted in more CV events



1. Kannel et al. Ann Intern Med 1971;74:1–12.
2. MRFIT Research Group. Prev Med 1986;15:254–273.

Effetto dei trattamenti ipolipemizzanti in relazione alla DURATA DEL TRATTAMENTO



Per ogni riduzione di 1 mmol / l di LDL-C ottenuta con la terapia statina:

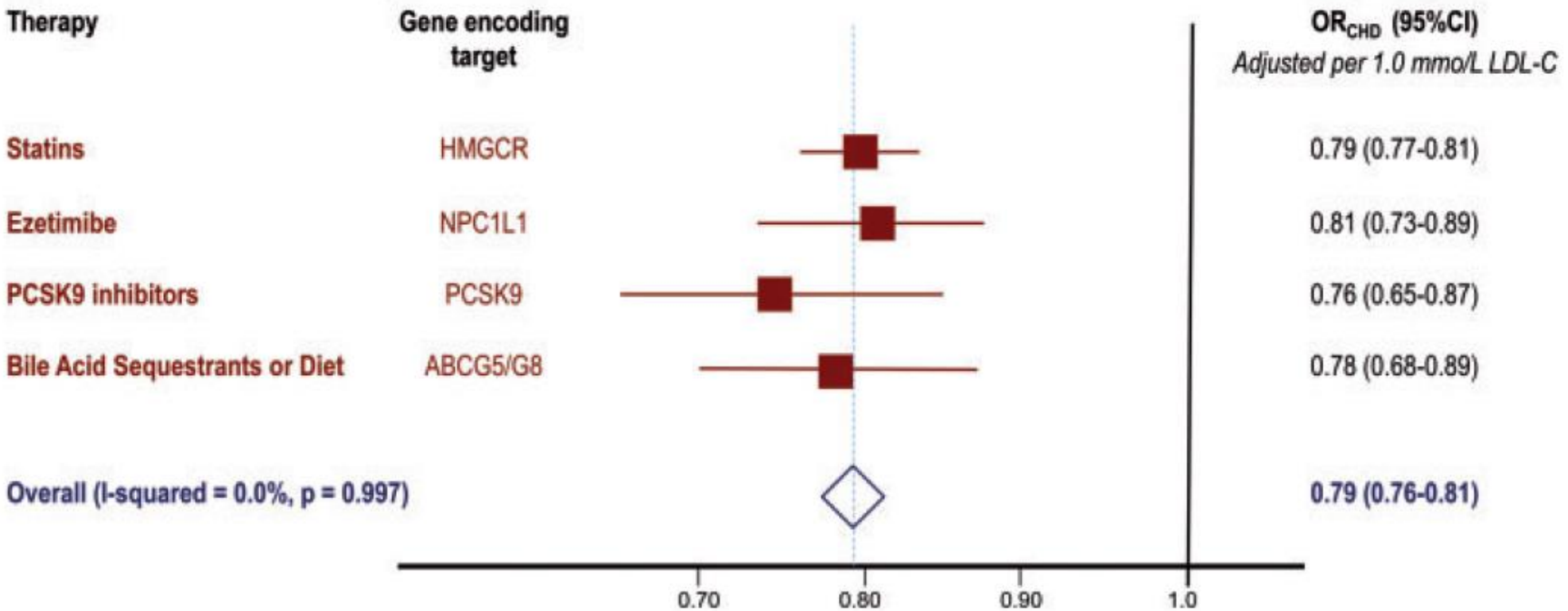
- ✓ 1 anno = RRR 12%
- ✓ 2 anni = RRR 17%
- ✓ 3 anni = RRR 20%
- ✓ 4 o più anni = RRR 22%

*Eventi cardiovascolari maggiorni: morte cardiovascolare, infarto del miocardio, ictus o rivascolarizzazione urgente

Brian A. Ference et al., European Heart Journal 2017

Low-density lipoproteins cause atherosclerotic cardiovascular disease. 1. Evidence from genetic, epidemiologic, and clinical studies.

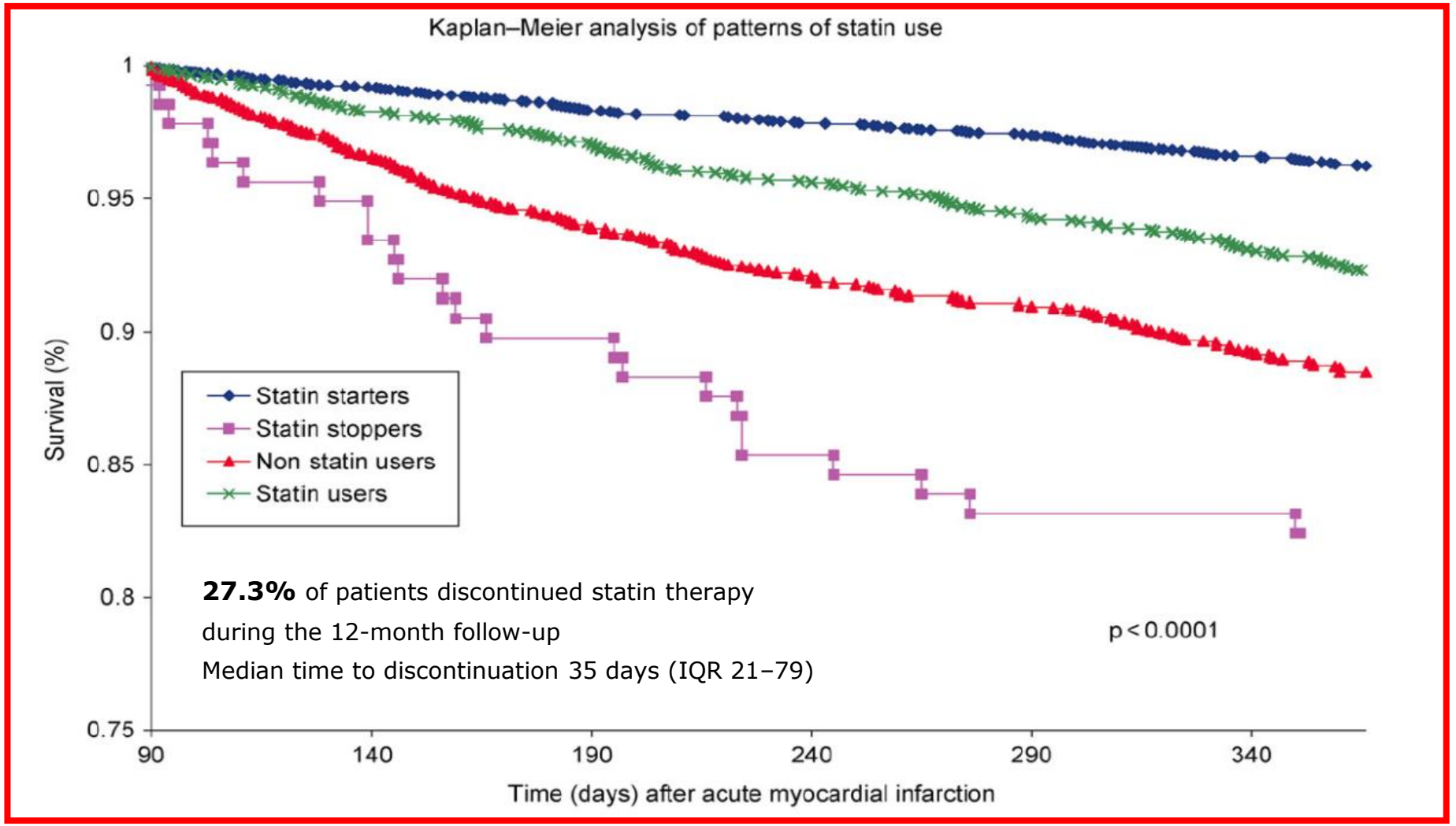
Effect of exposure to lower LDL-C by mechanism of LDL-C lowering



Risk of cardiovascular events

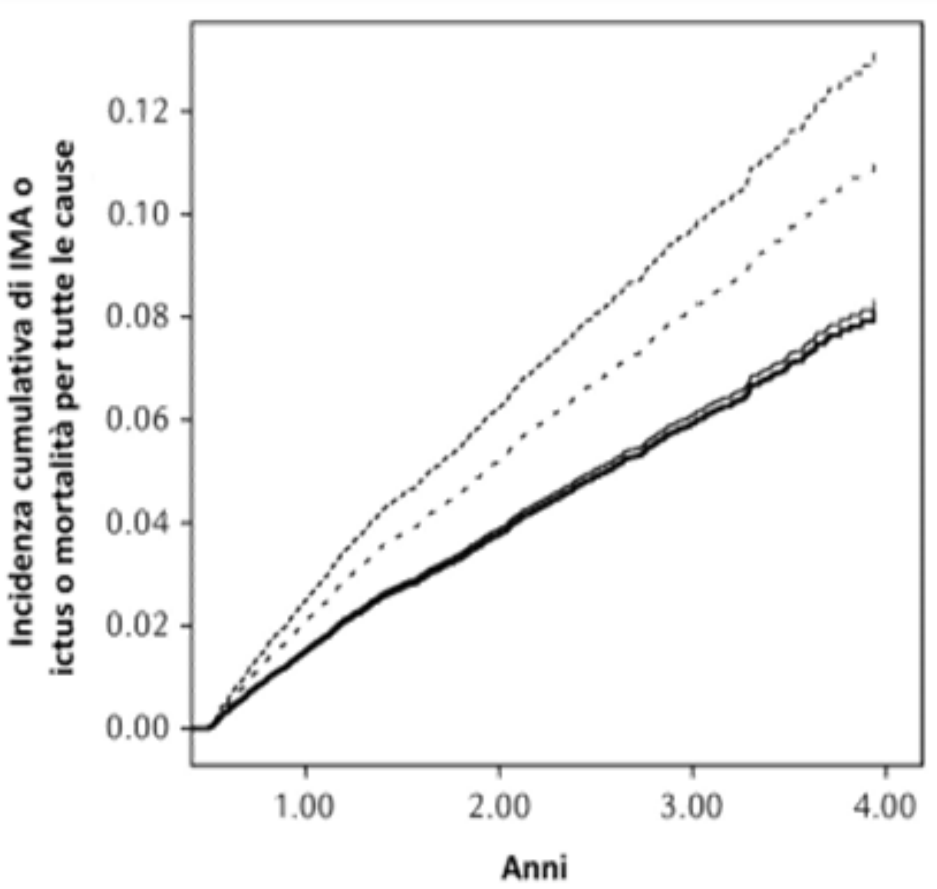
European Heart Journal 2017; 38, 2459

Discontinuation of statin therapy after ACS



Eur Heart J 2008; 29 2083-91

Interruzione della terapia

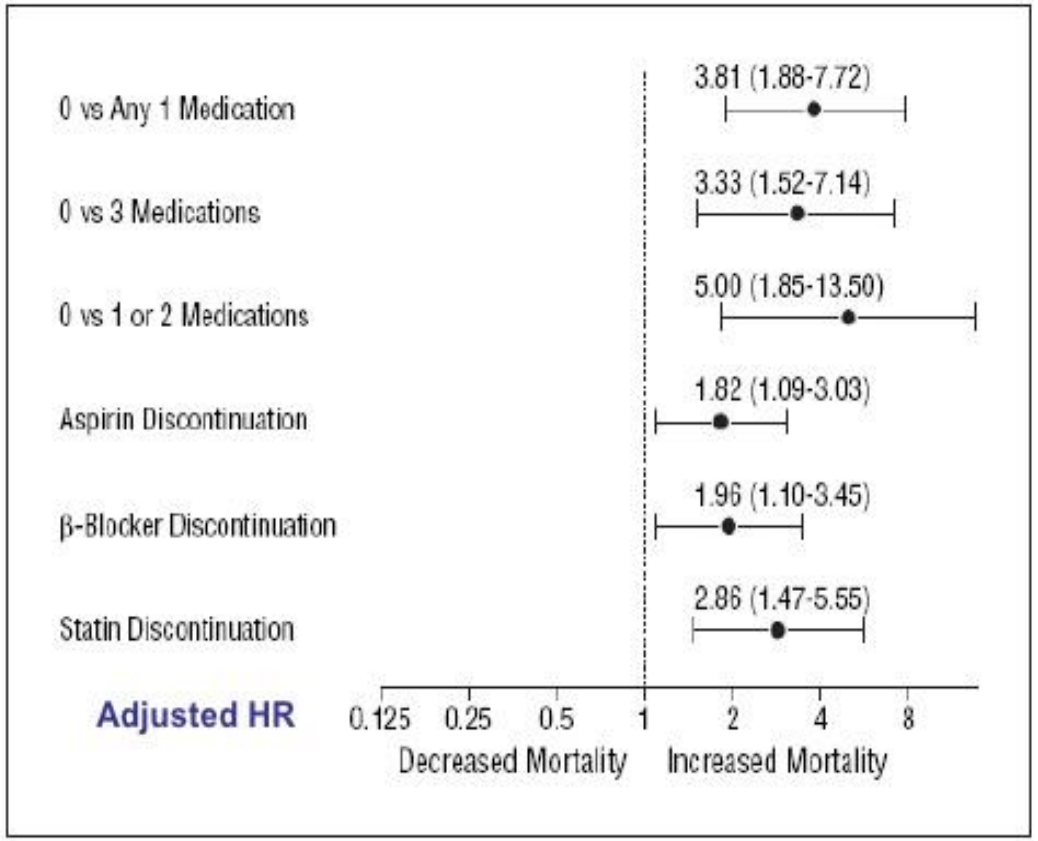


Livello di aderenza

- Basso
- Intermedio-basso
- Intermedio-alto
- Alto

Impact of Medication Therapy Discontinuation on Mortality After Myocardial Infarction

P. Michael Ho, MD, PhD; John A. Spertus, MD, MPH; Frederick A. Masoudi, MD, MSPH; Kimberly J. Reid, MS; Eric D. Peterson, MD, MPH; David J. Magid, MD, MPH; Harlan M. Krumholz, MD, SM; John S. Rumsfeld, MD, PhD



Ho, P. M. et al. Arch Intern Med 2006;166:1842-1847.

European Heart Journal Advance Access published May 23, 2016

European Heart Journal
doi:10.1093/eurheartj/ehw106

JOINT ESC GUIDELINES

2016 European Guidelines on cardiovascular disease prevention in clinical practice

The Sixth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of 10 societies and by invited experts)

Very high-risk	Subjects with any of the following: • Documented CVD, clinical or unequivocal on imaging. Documented clinical CVD includes previous AMI, ACS, coronary revascularization and other arterial revascularization procedures, stroke and TIA, aortic aneurysm and PAD. Unequivocally documented CVD on imaging includes significant plaque on coronary angiography or carotid ultrasound. It does NOT include some increase in continuous imaging parameters such as intima–media thickness of the carotid artery. • DM with target organ damage such as proteinuria or with a major risk factor such as smoking or marked hypercholesterolaemia or marked hypertension. • Severe CKD (GFR <30 mL/min/1.73 m2). • A calculated SCORE ≥10%.
High-risk	Subjects with: • Markedly elevated single risk factors, in particular cholesterol >8 mmol/L (>310 mg/dL) (e.g. in familial hypercholesterolaemia) or BP ≥180/110 mmHg. • Most other people with DM (with the exception of young people with type 1 DM and without major risk factors that may be at low or moderate risk). • Moderate CKD (GFR 30–59 mL/min/1.73 m^2). • A calculated SCORE ≥5% and <10%.
Moderate risk	SCORE is ≥1% and <5% at 10 years. Many middle-aged subjects belong to this category.
Low-risk	SCORE <1%.

C-LDL mg/dl

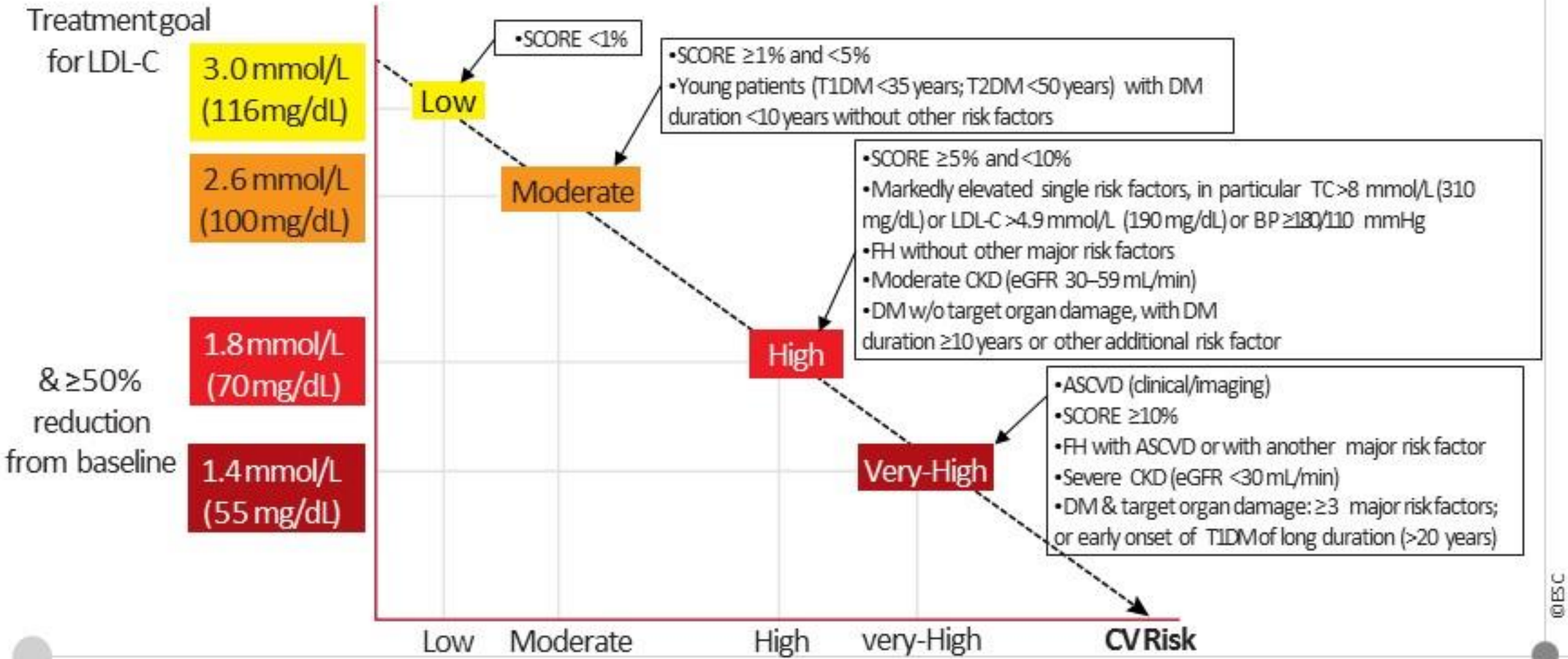
70

100

115

Central Illustration Upper panel Treatment goals for low-density lipoprotein cholesterol (LDL-C) across categories of total cardiovascular disease risk

EAS ESC European Society of Cardiology

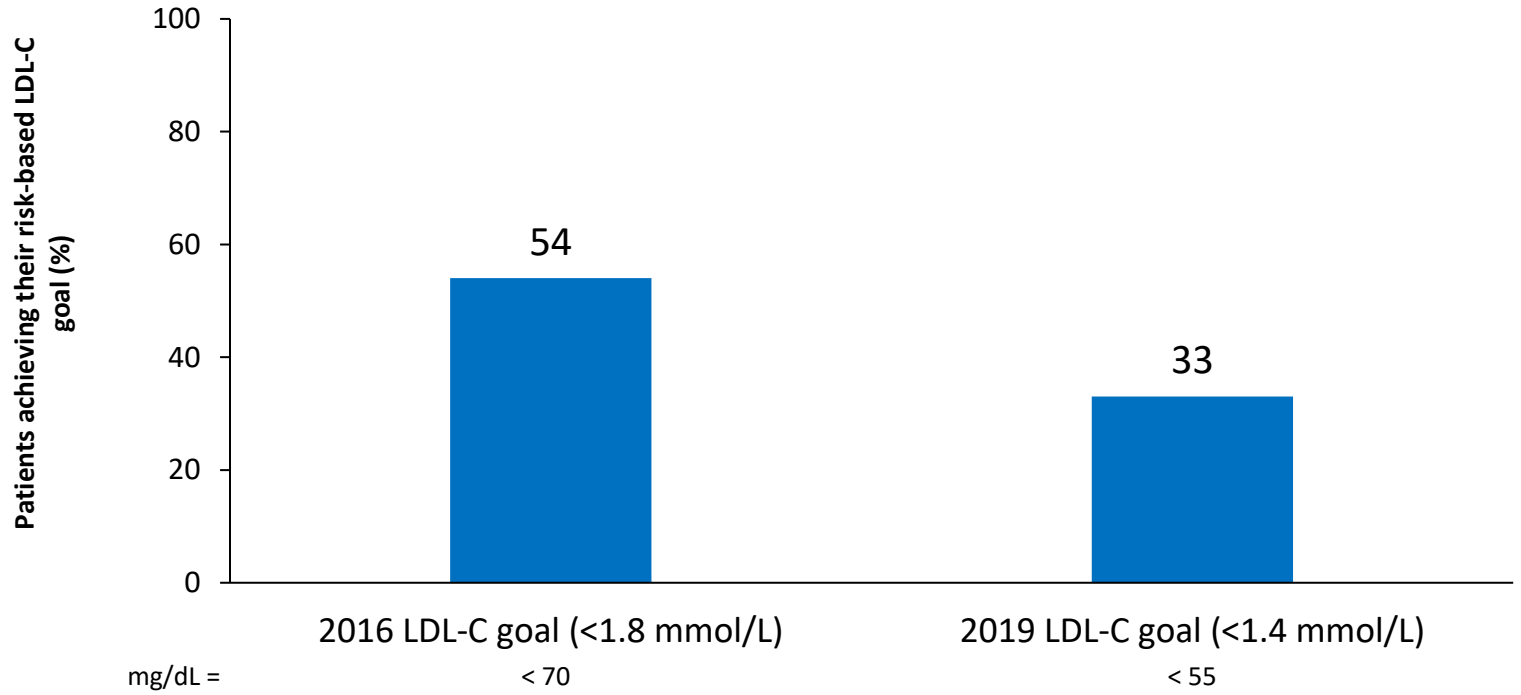


www.escardio.org/guidelines

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 -doi: 10.1093/eurheartj/ehz455)

EU-Wide Cross-Sectional Observational Study of Lipid-Modifying Therapy Use in Secondary and Primary Care – the DA VINCI Study

Overall, Goal Achievement of 2016 & 2019 ESC/EAS LDL-C Recommendations was Low



Overall, fewer patients attained the 2019 LDL-C goals in comparison to the 2016 goals (33% vs 54%) with a lower likelihood of goal attainment with increasing risk (i.e. lower LDL-C goal)

*Stabilised LLT at time of LDL-C measurement. combo, combination
LDL-C = low-density lipoprotein cholesterol

Ray, KK, et al. *Eur J Prev Cardiol*. 2020. doi:10.1093/eurjpc/zwaa047.

Caso Clinico

- Uomo di 54 anni
- Ipertensione arteriosa
- Ipercolesterolemia
- Cardiopatia ischemica cronica

Storia della malattia coronarica

2016 NSTEMI

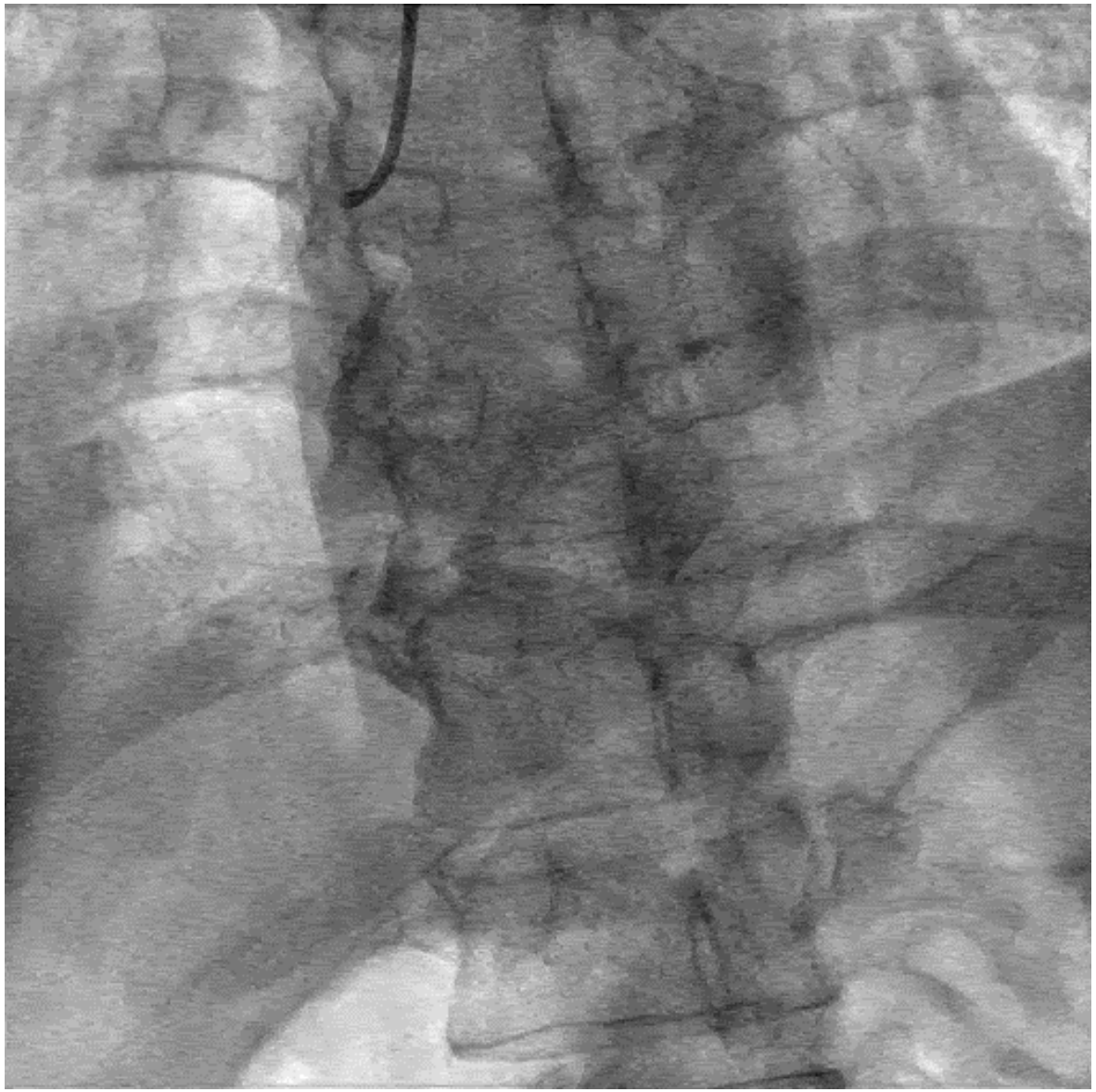
- PCI di IVA e Cx

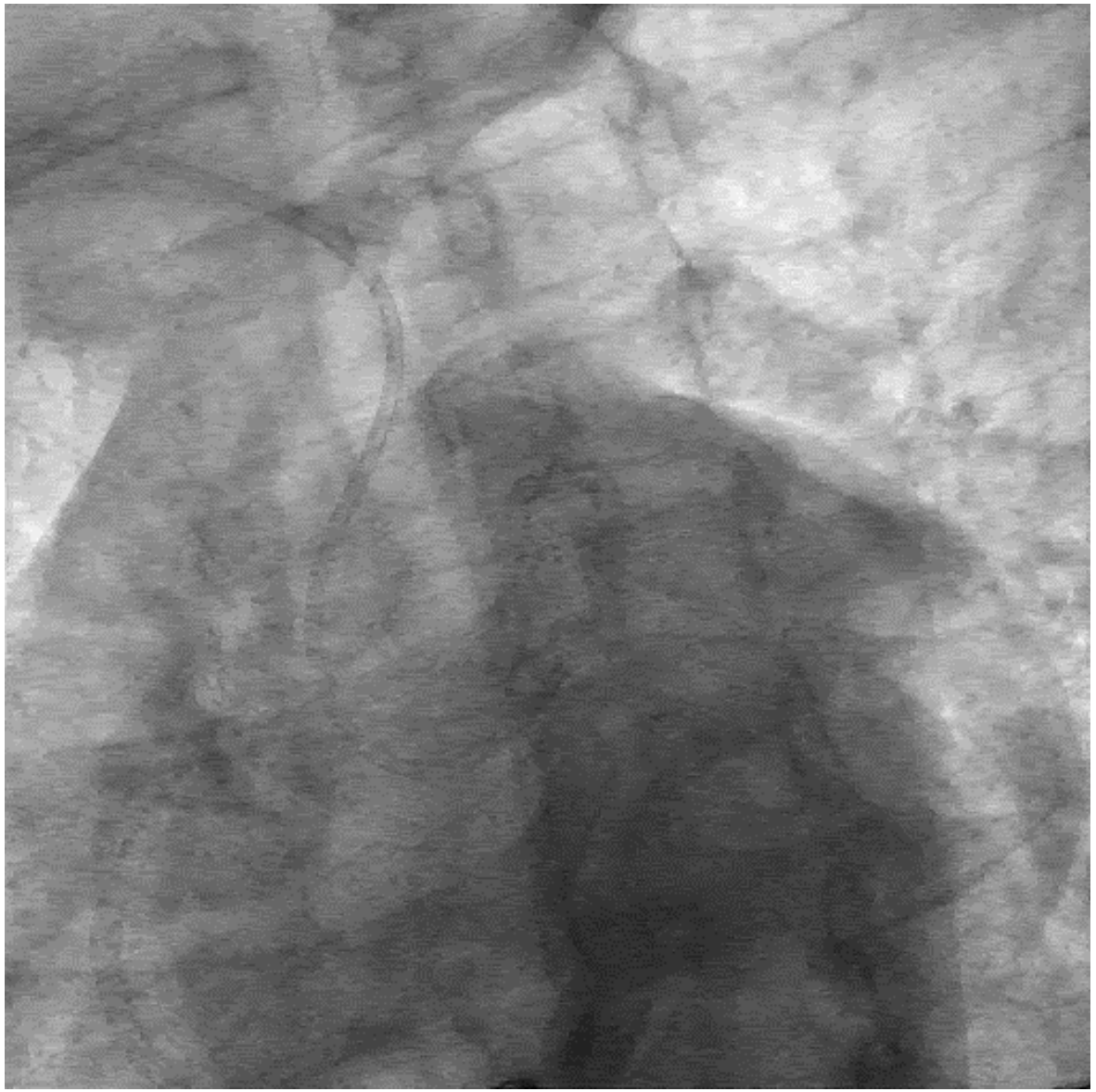
2020 NSTEMI

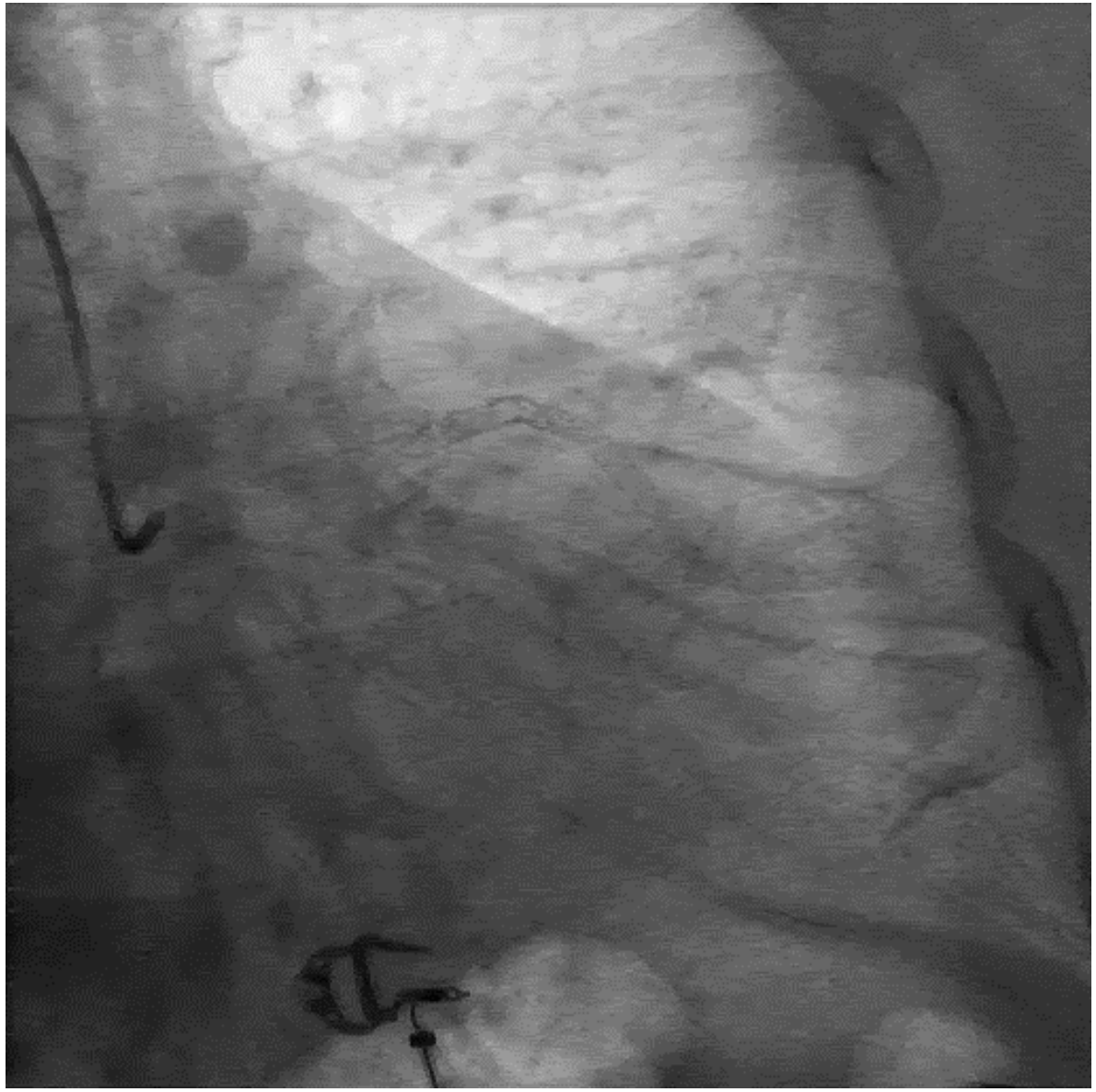
- PCI di IVA e Codx

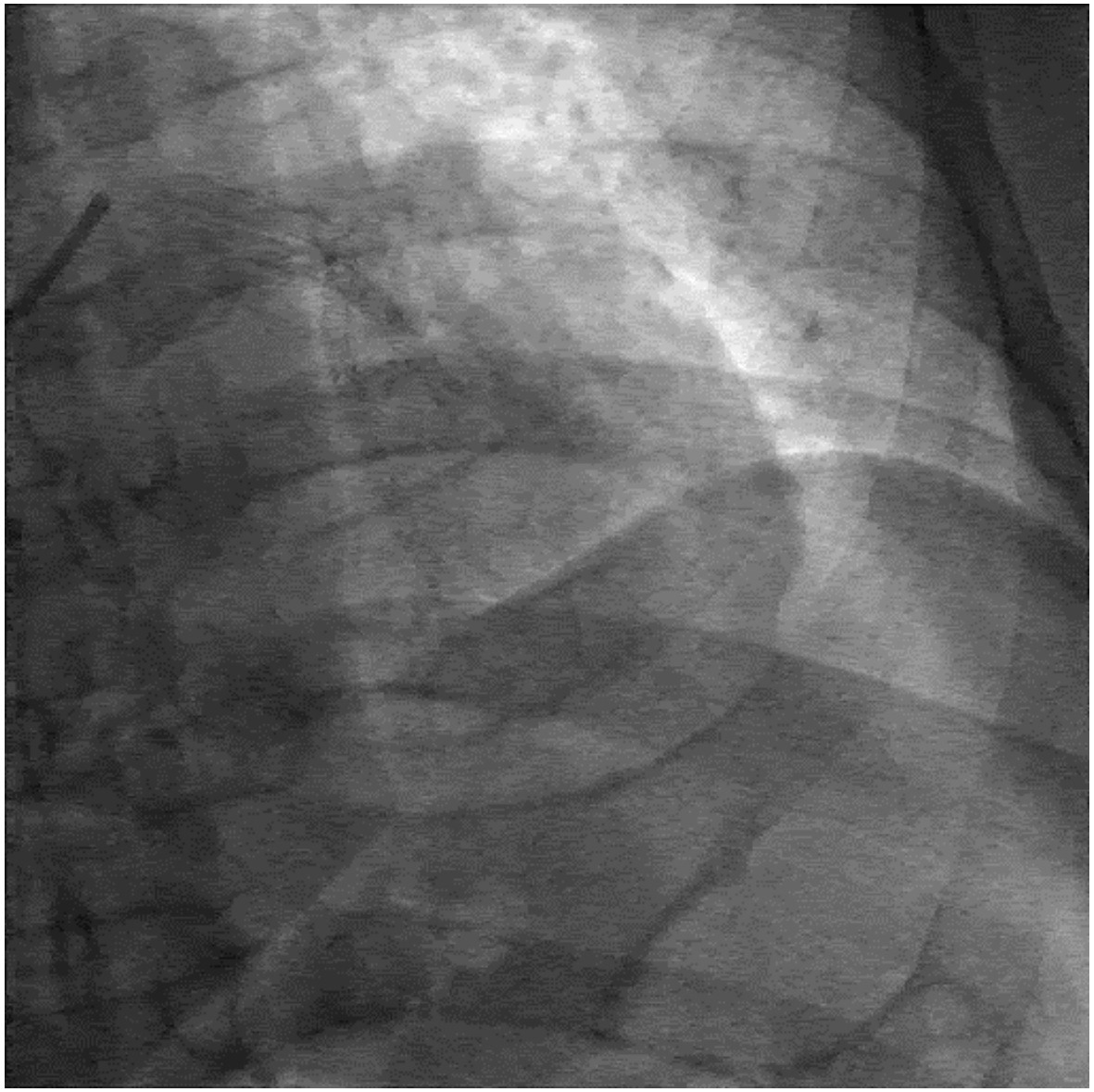
2021 ricovero per angina da sforzo

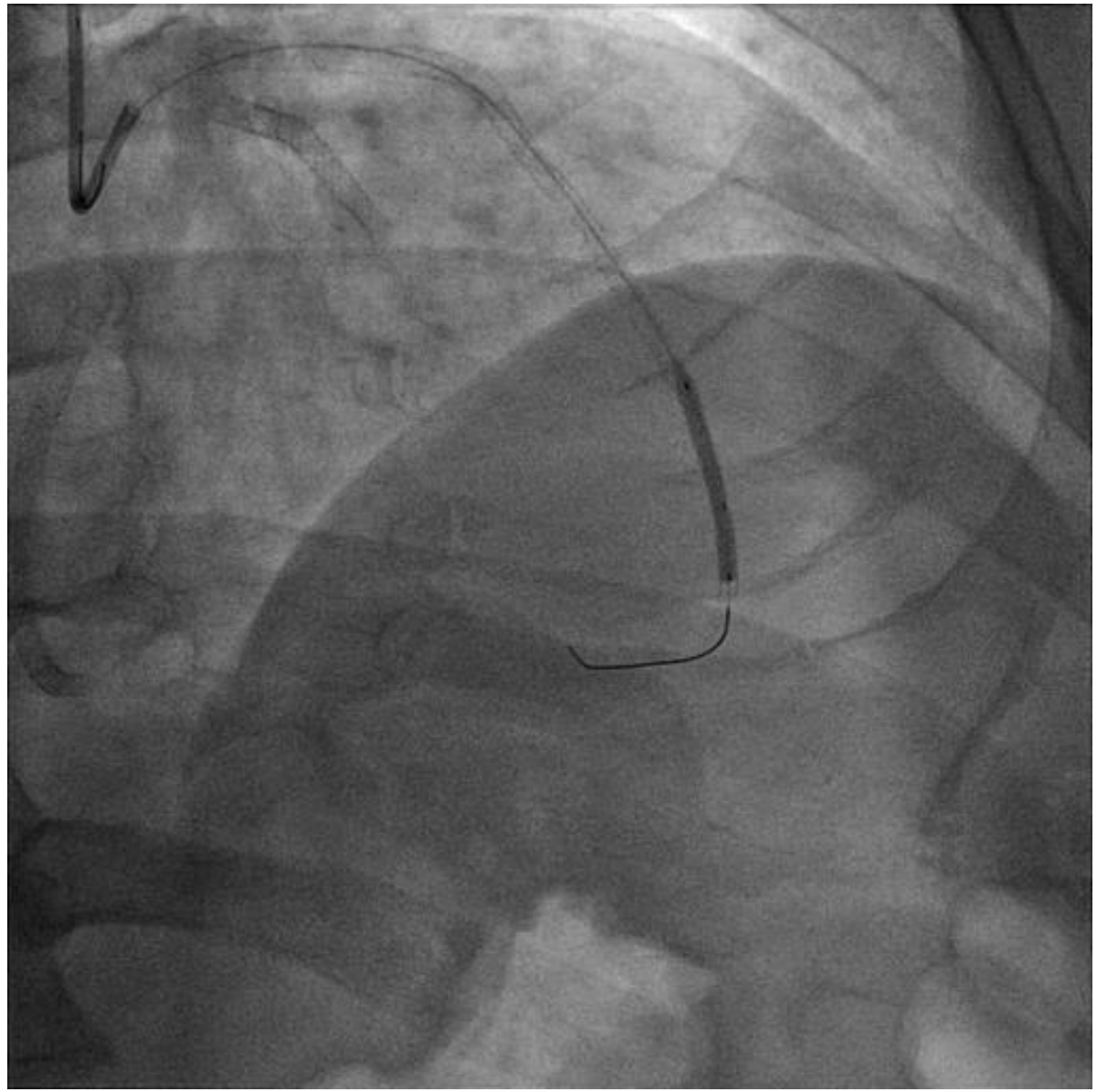
- Coronarografia…

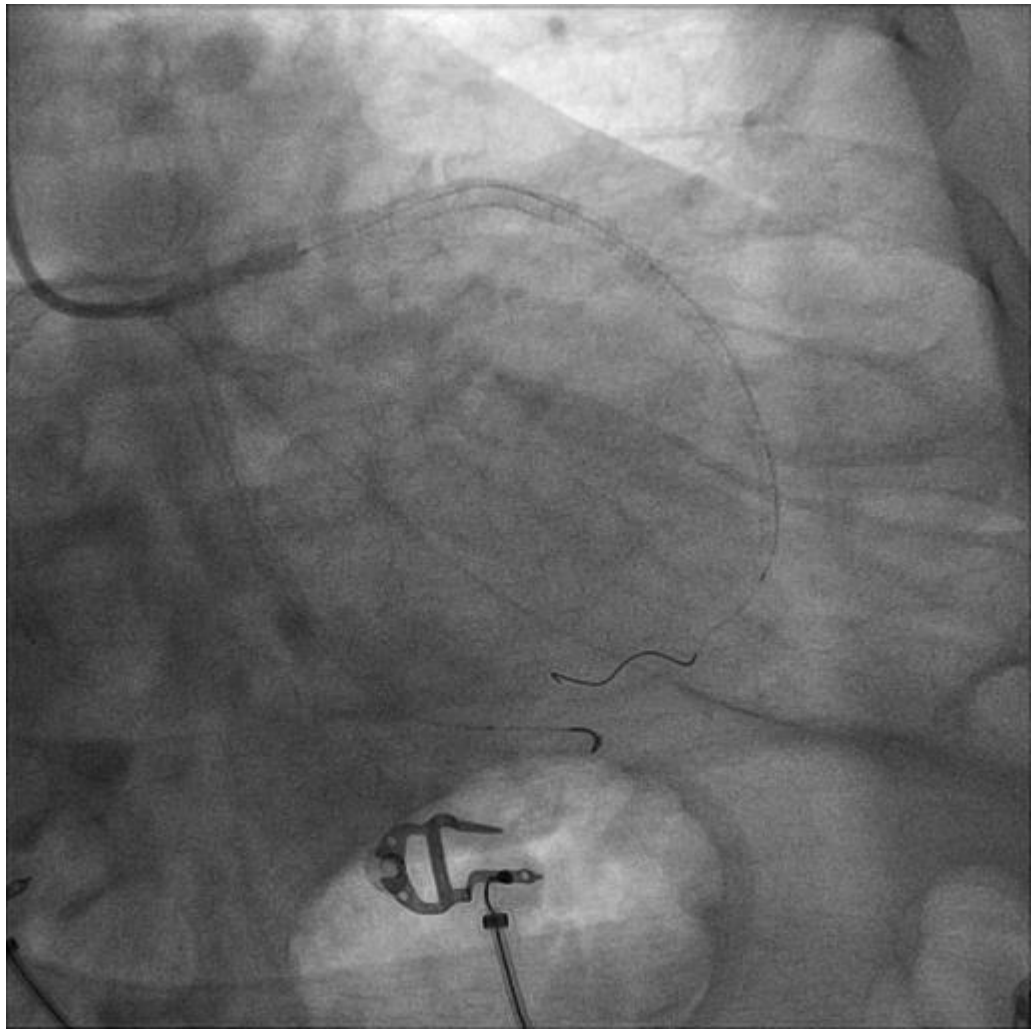


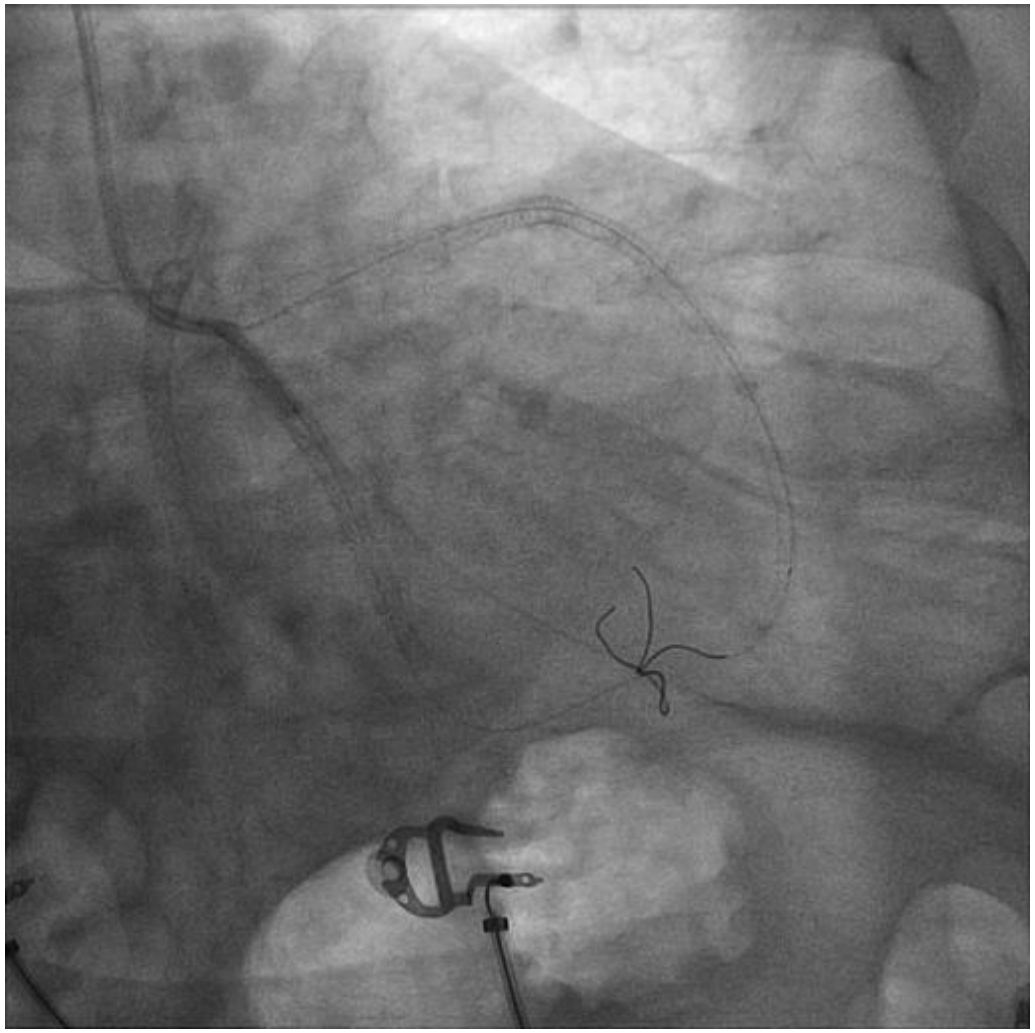


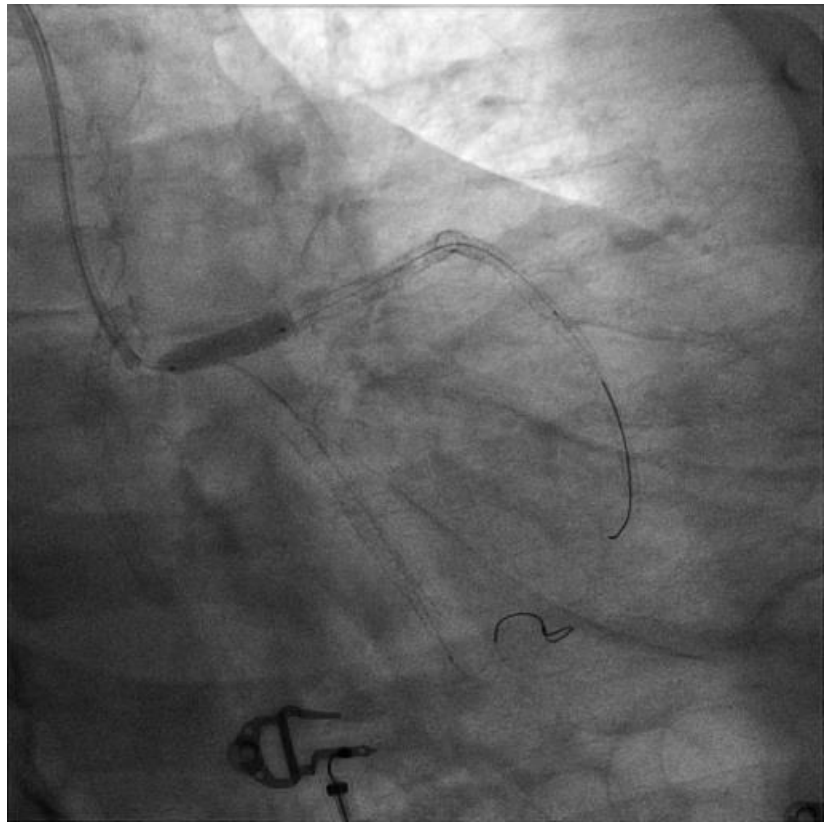


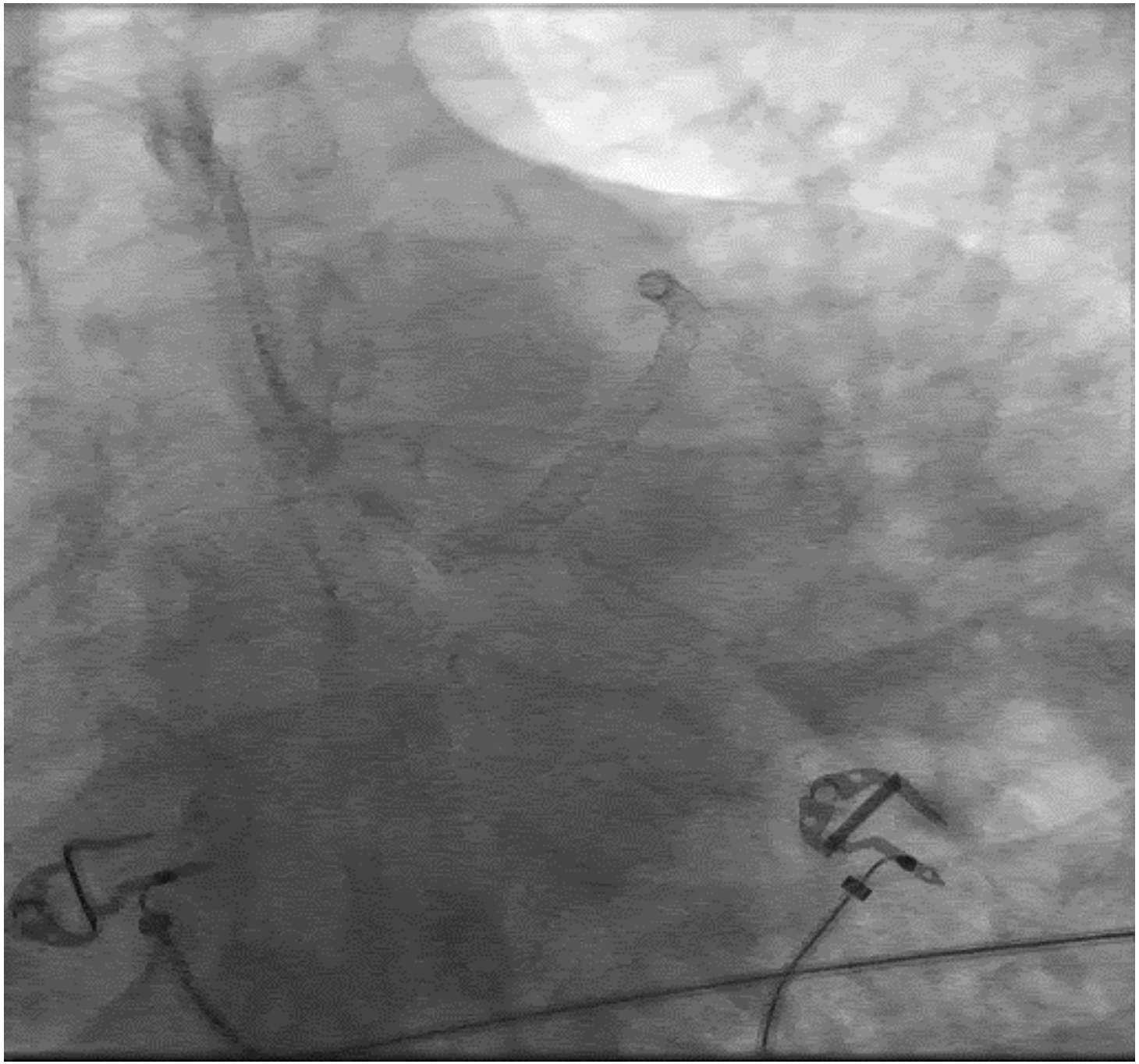


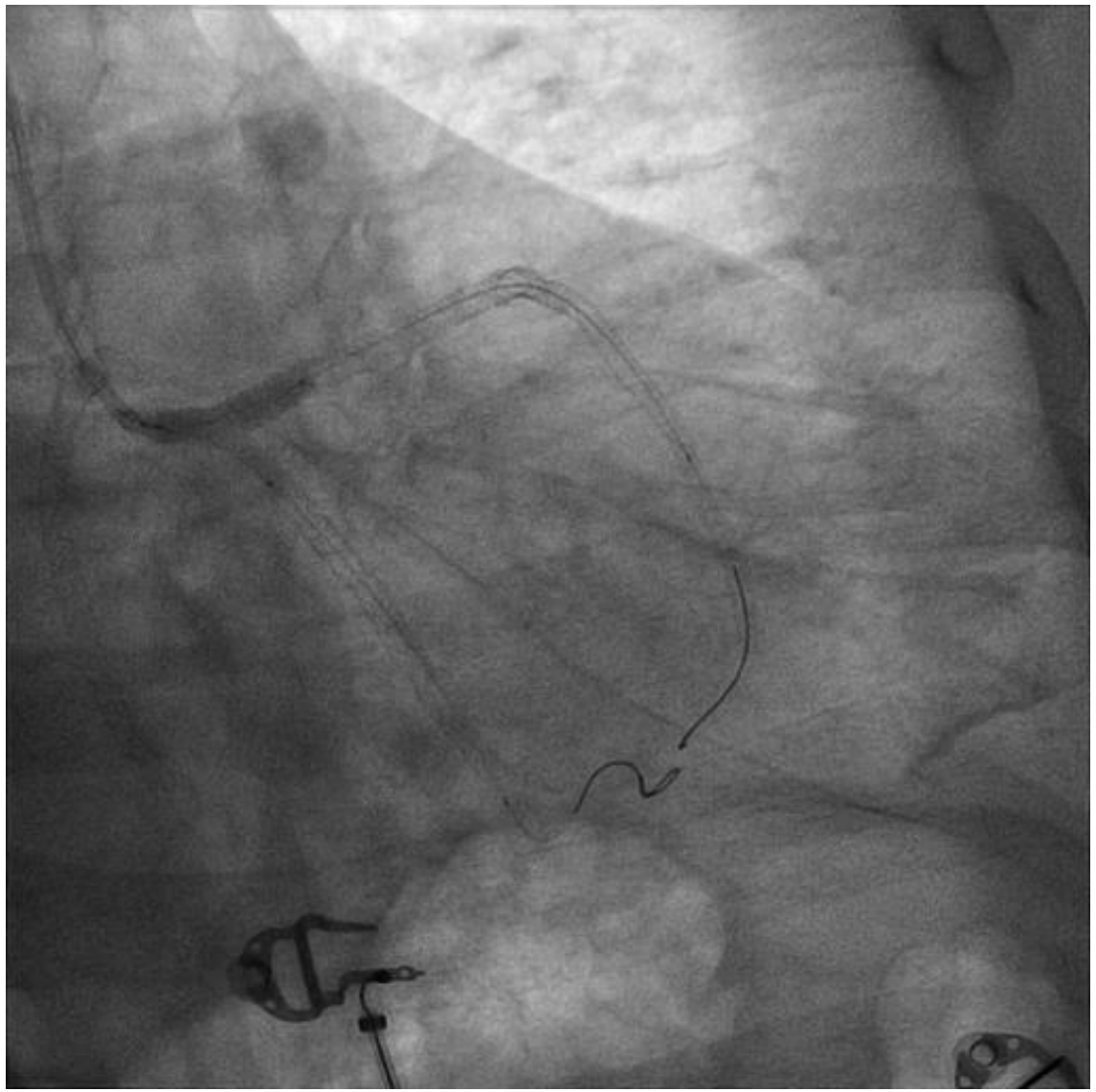


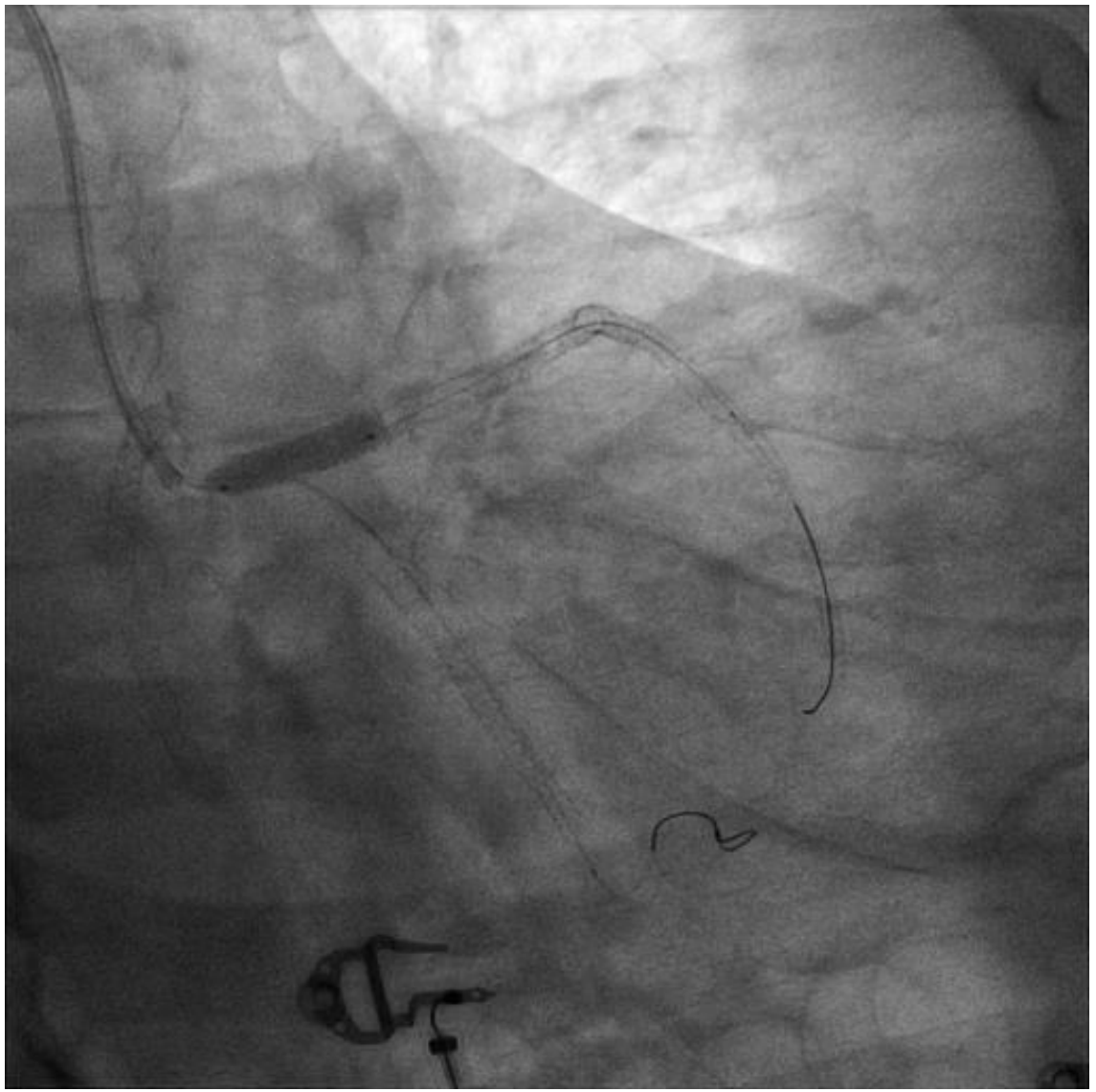


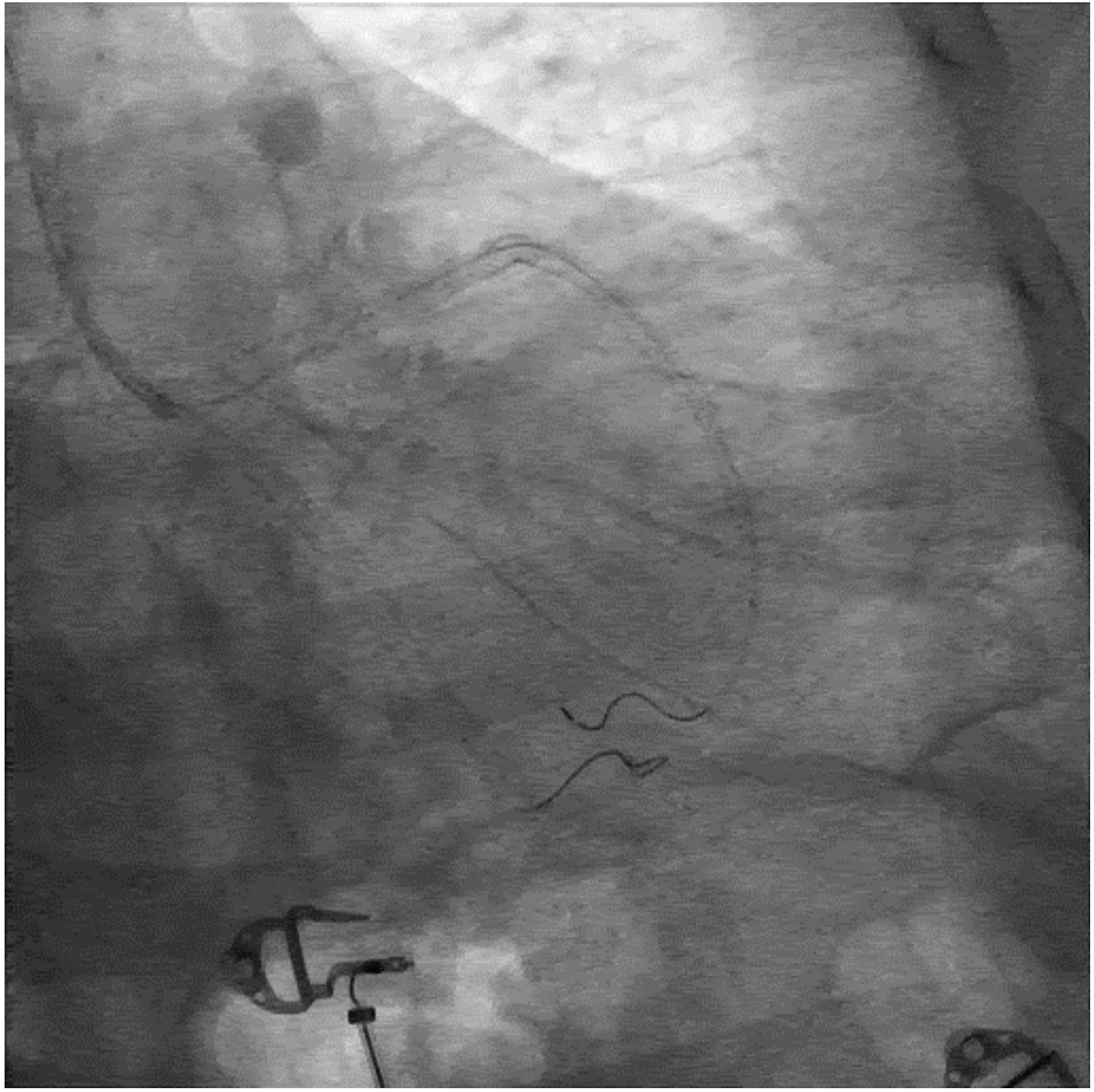




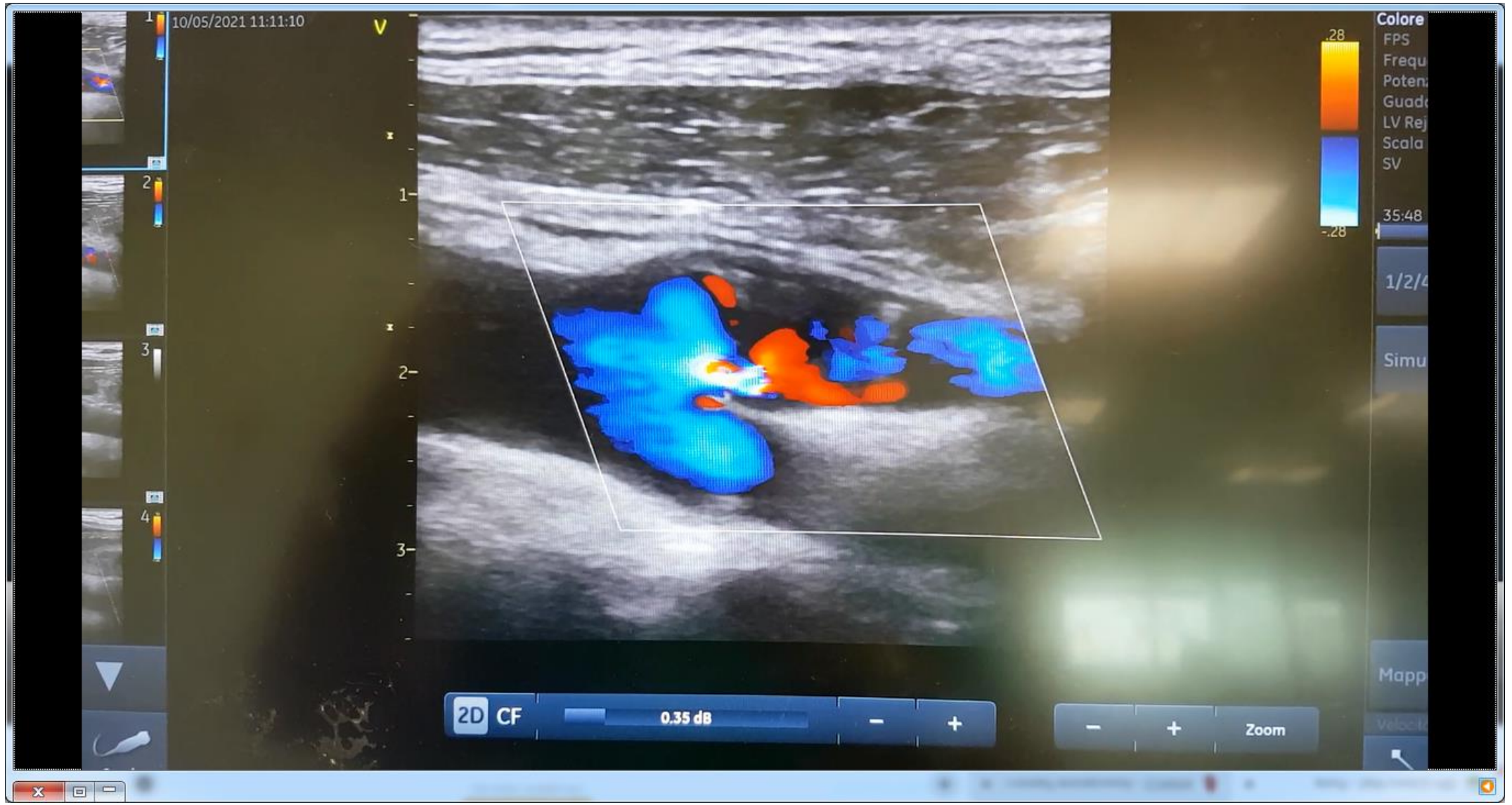




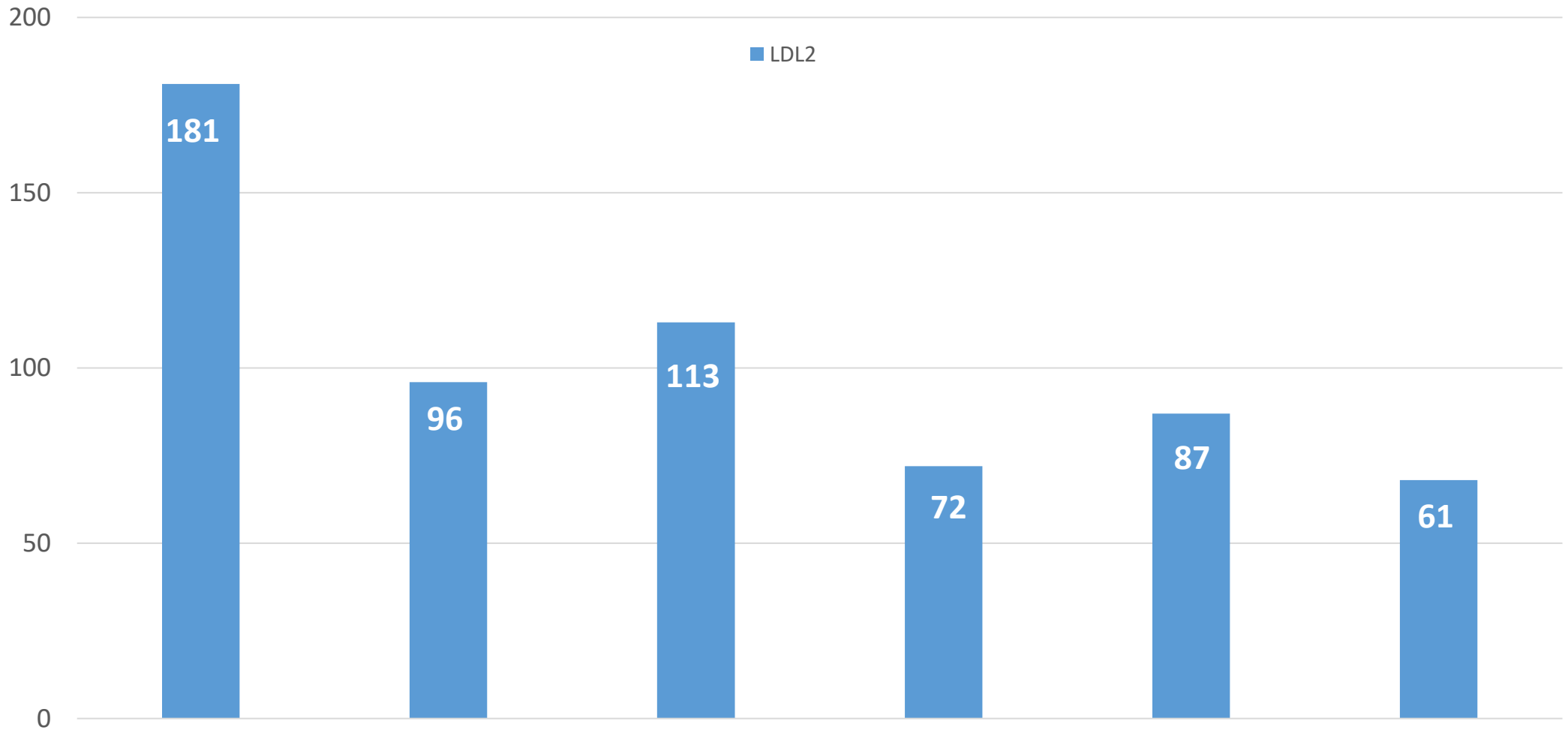




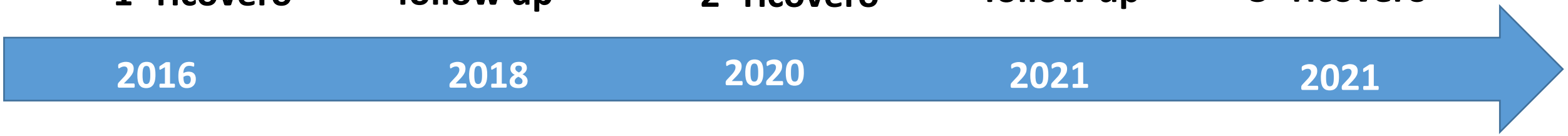
Patologia Carotidea



Andamento del C-LDL dal 2016 al 2020



Terapia dal 2016 al 2020



ASA 100 mg die
Clopidogrel 75 mg die
Metopololo 100 mg x 2 die
Ramipril 5 mg die
Atorvastatina 80 mg die

ASA 100 mg die
Ramipril 5 mg
Amlodipina 5 mg die
Bisoprolo 1,25 mg die
Sinvastatina 80 mg die
Ezetimibe 10 mg die

switching da Atorva a Sinva + Ezetimibe per riferite **mialgie**

Terapia alla dimissione
ASA 100 mg die
Brilique 90 mg x 2 die
Ramipril 5 mg
Amlodipina 5 mg die
Bisoprolo 1,25 mg die
Rosuvastatina 40 mg

Terapia alla dimissione
ASA 100 mg die
Brilique 90 mg x 2 die
Ramipril 5 mg
Amlodipina 5 mg die
Bisoprolo 1,25 mg die
Rosuvastatina 20 mg

ASA 100 mg die
Brilique 90 mg x 2 die
Ramipril 5 mg
Amlodipina 5 mg die
Bisoprolo 1,25 mg die
Rosuvastatina 40 mg
Ezetemibe 10 mg

CASO CLINICO

Criticità

- **Aderenza terapeutica**
  - effetti collaterali (mialgie)
  - counseling

- **Raggiungimento dei target terapeutici**
  - accurata stratificazione del rischio

Quale strategia terapeutica per il nostro paziente?

PCSK9 nei pazienti con

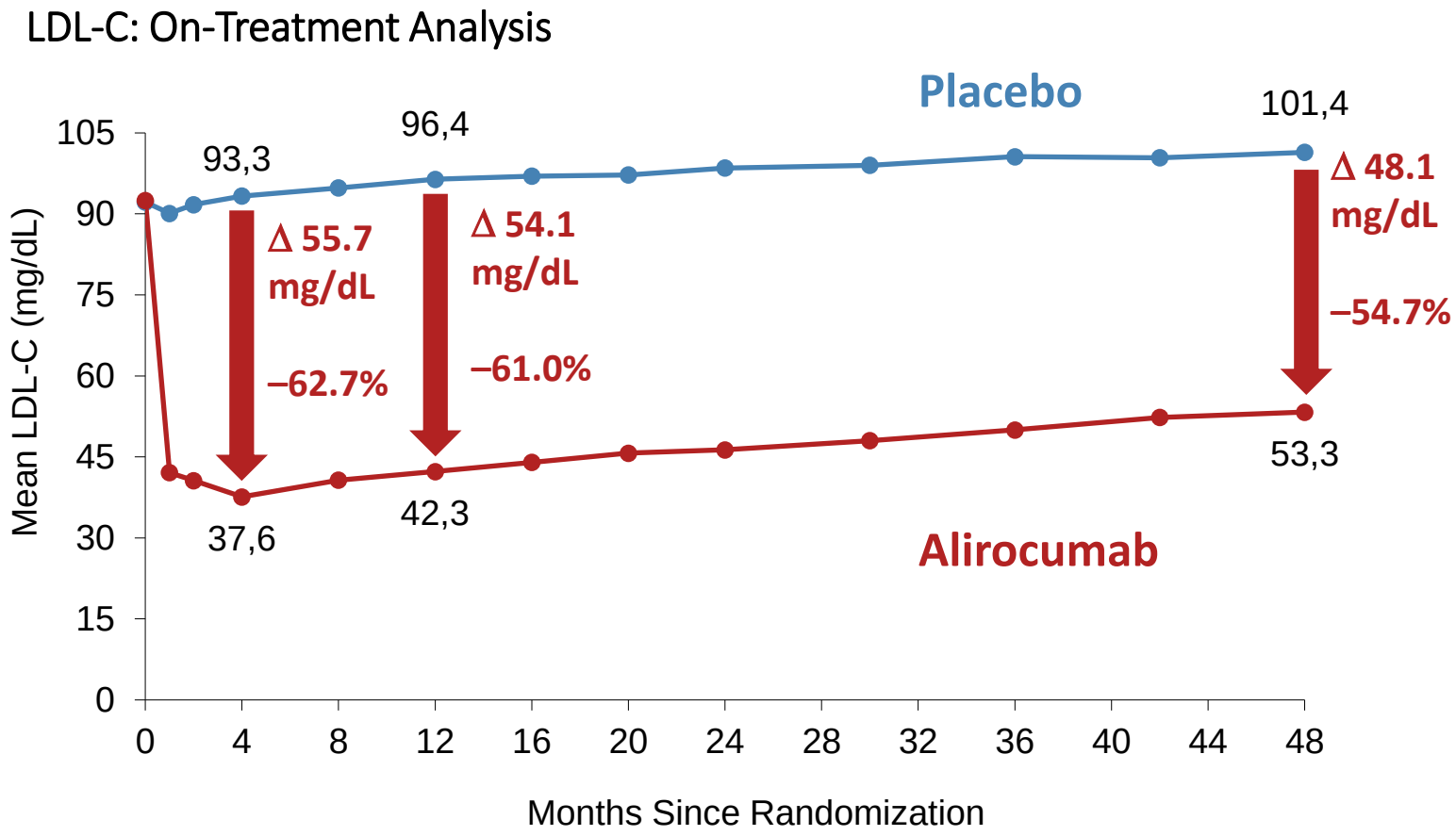
- IMA recente (<12 mesi)
- IMA ricorrente
- Estensione della malattia coronarica
- Sottoposti a rivascolarizzazione
- **Sindrome coronarica acuta**

PCSK9 nei pazienti con

- **IMA recente**
- IMA ricorrente
- Estensione della malattia coronarica
- Sottoposti a rivascolarizzazione
- **Sindrome coronarica acuta**

PCSK9 & IMA recente

The ODYSSEY OUTCOMES Trial: Topline Results
Alirocumab in Patients After Acute Coronary Syndrome



Main Inclusion Criteria

9462 patients

Age ≥40 years

ACS

1 to 12 months prior to randomization

Acute myocardial infarction (MI) or unstable angina

High-intensity statin therapy

Atorvastatin 40 to 80 mg daily or

Rosuvastatin 20 to 40 mg daily or

Maximum tolerated dose of one of these agents for ≥2 weeks

Inadequate control of lipids

LDL-C ≥70 mg/dL (1.8 mmol/L) or

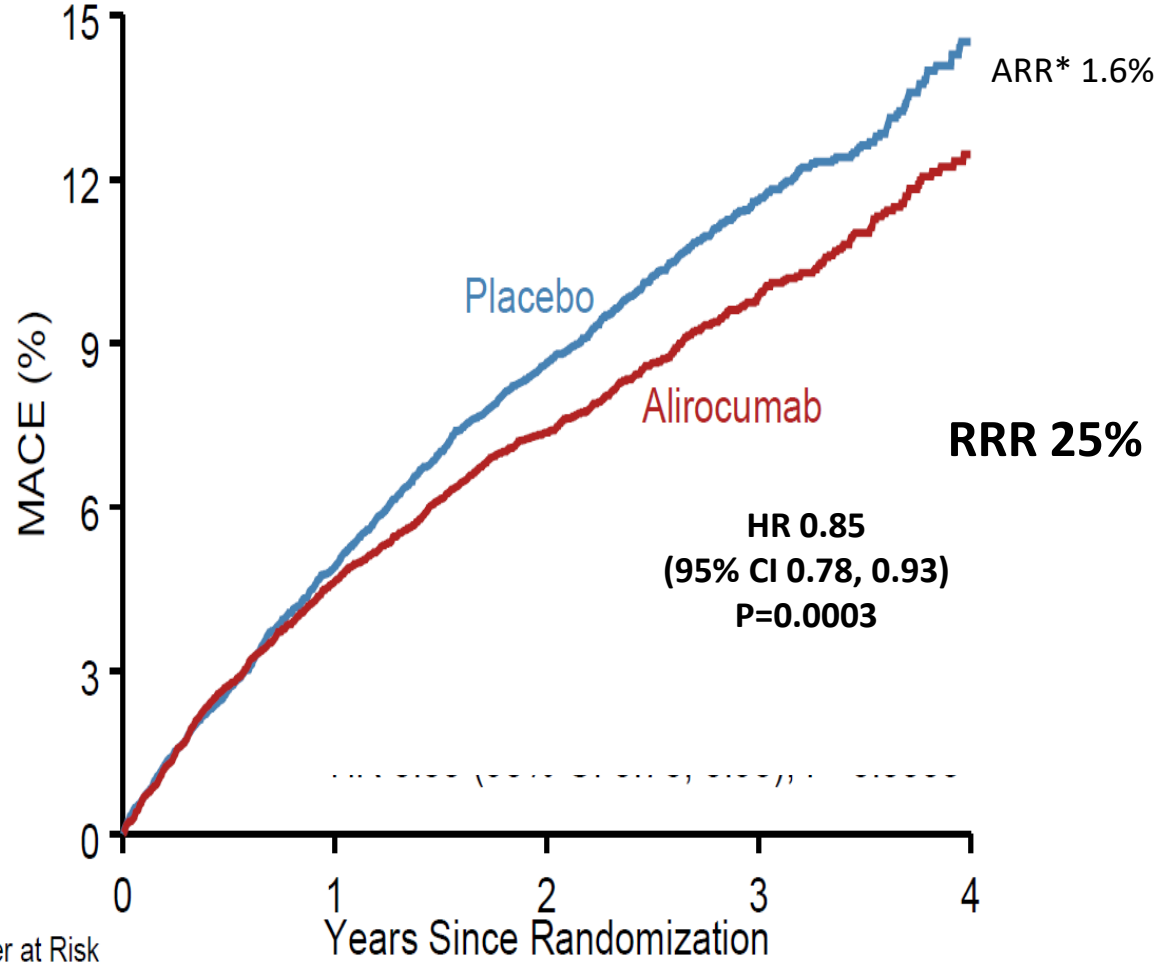
Non-HDL-C ≥100 mg/dL (2.6 mmol/L) or

Apolipoprotein B ≥80 mg/dL

Excludes LDL-C values after premature treatment discontinuation or blinded switch to placebo
Approximately 75% of months of active treatment were at the 75 mg dose

Schwartz GG, et al. Am Heart J 2014;168:682-689.e1.

Primary Efficacy Endpoint: MACE



MACE: CHD death, non-fatal MI, ischemic stroke, or unstable angina requiring hospitalization

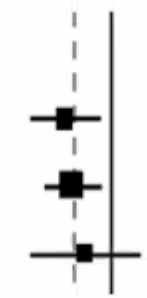
*Based on cumulative incidence

Schwartz GG, et al. Am Heart J 2014;168:682-689.e1.

INZIARE PRECOCEMENTE TERAPIA CON INIBITORI PCSK9

IL BENEFICIO E' TANTO MAGGIORE QUANDO SI INIZIA PRECOCEMENTE DOPO LA SCA

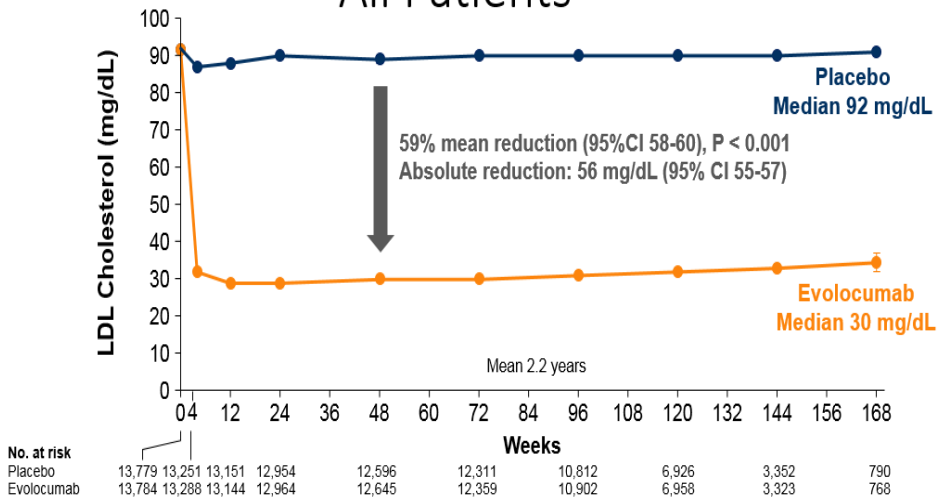
Subgroup	Patients	Incidence (%) Alirocumab	Incidence (%) Placebo	HR (95% CI)
Index to randomization				
<2 months	6178	10.3	12.3	0.83 (0.71–0.96)
2 to <6 months	9518	9.6	11.1	0.85 (0.75–0.96)
≥6 months	3228	8.0	8.7	0.90 (0.71–1.14)



Supplement to Schwartz GG, Steg PG et al. N Engl J Med 2018

FOURIER: Further cardiovascular OUtcomes Research with PCSK9 Inhibition in subjects with Elevated Risk

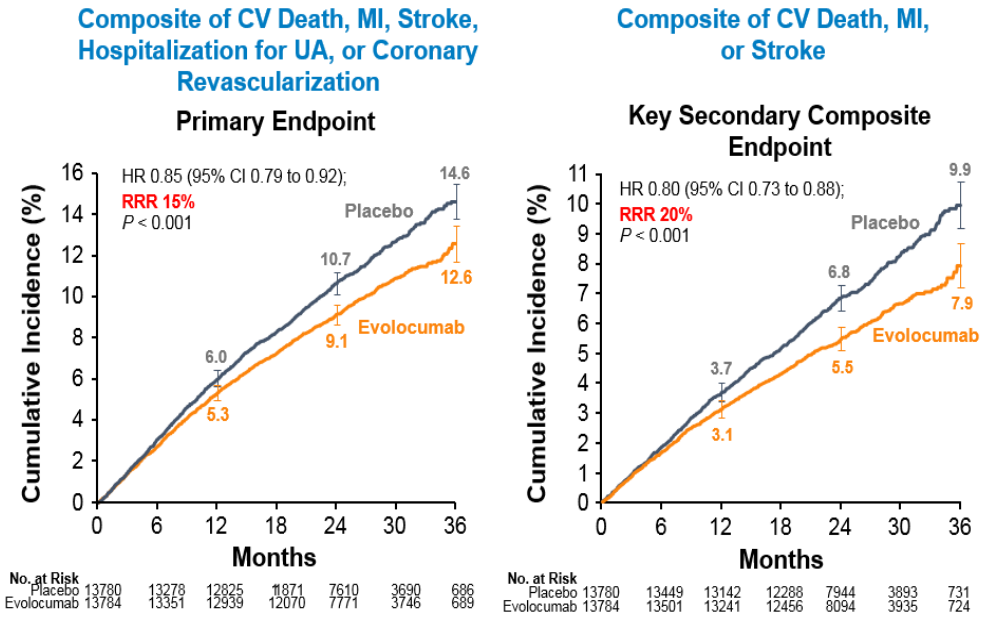
Median LDL-C Levels Over Time: All Patients



LDL-C was significantly reduced in the evolocumab group (median: 30 mg/dL) including 42% who achieved levels ≤ 25 mg/dL vs < 0.1% in the placebo group

Data shown are median values with 95% confidence intervals in the two arms; ITT.
Sabatine MS, et al . *NEJM*. [published online ahead of print March 17, 2017]. doi: 10.1056/NEJMoa1615664

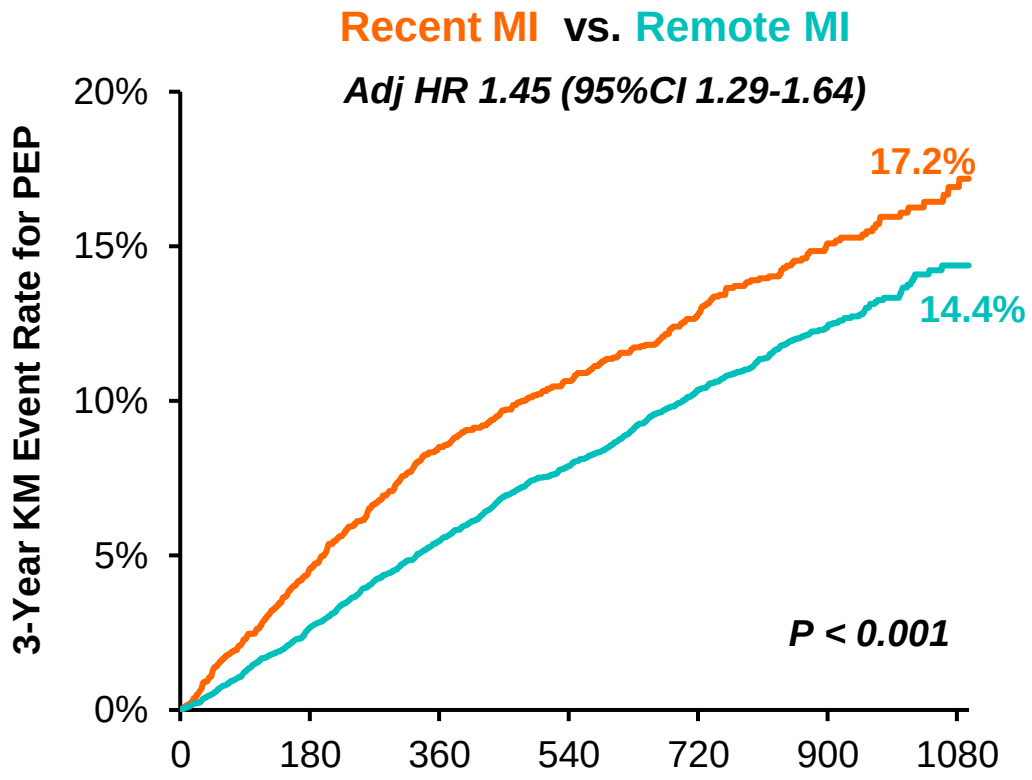
Evolocumab Outcomes Trial: Primary and Key Secondary Endpoints Were Met With Statistical Significance

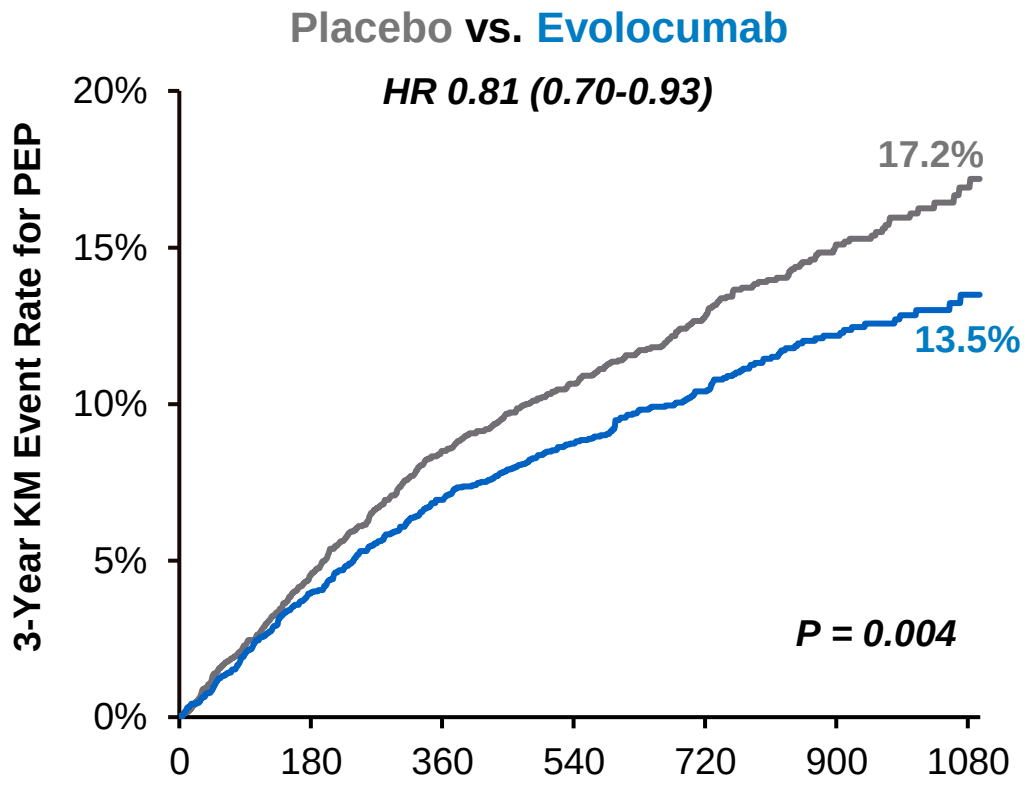


CI = confidence interval; CV = cardiovascular; HR = hazard ratio; MI = myocardial infarction; UA = unstable angina.
Sabatine MS, et al. N Engl J Med. 2017;376:1713-1722.

Sabatine MS, et al. N Engl J Med. 2017;376:1713-1722

I pazienti a maggior rischio CV, come i pazienti con un MI recente (< 12 mesi) mostrano il maggior beneficio da una terapia ipolipemizzante aggressiva



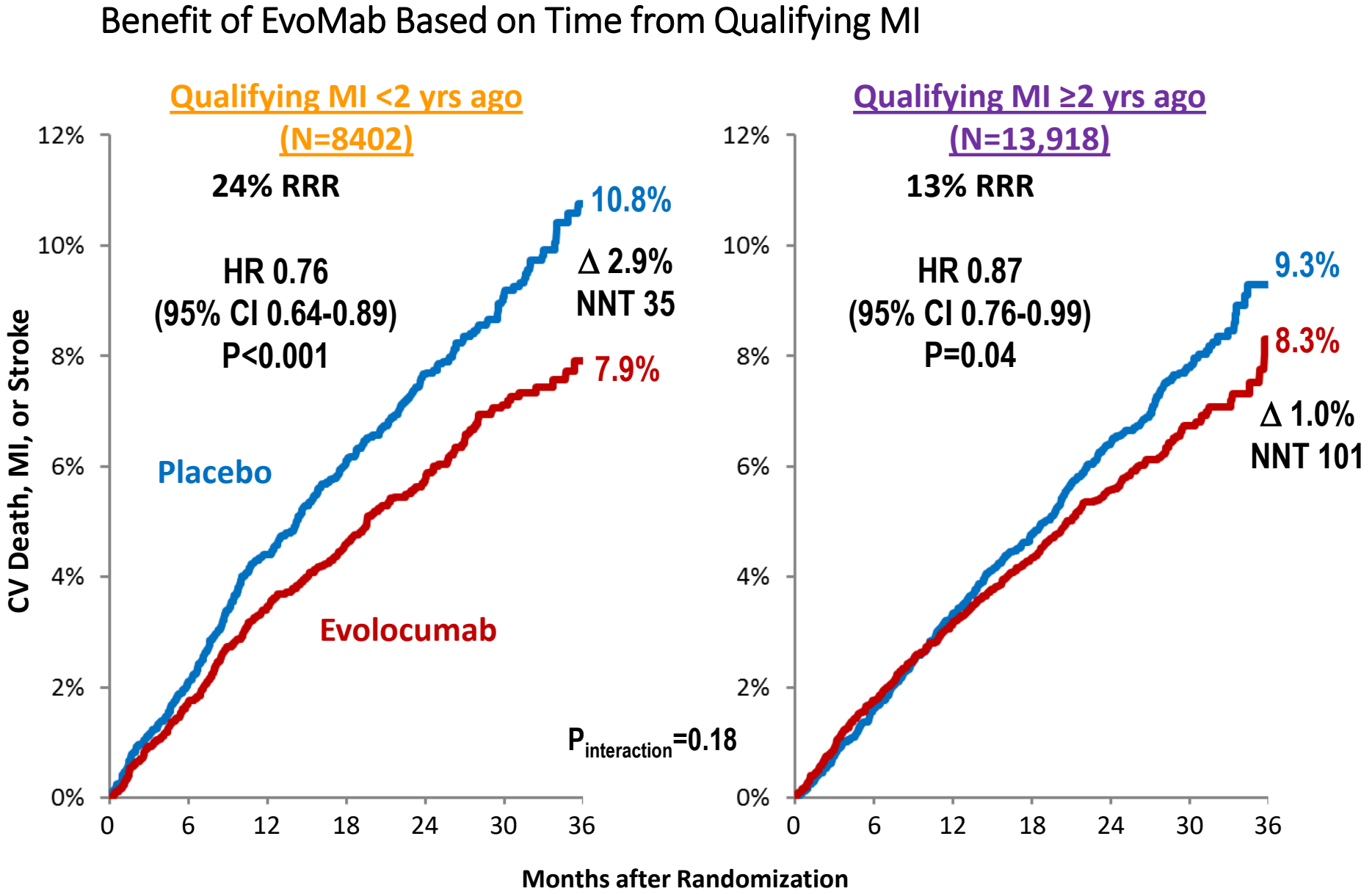


In recent MI patients, evolocumab reduced the risk of the primary endpoint by 19%, with an NNT of 27 over 3 years

22320 Fourier patients with prior MI were stratified as: recent (≤12 months; n= 5711) vs. remote MI (>12 months; n= 16609). Those with recent MI had a median time of 4.8 months from MI. PEP: CV death, MI, stroke, hospitalization for UA, or coronary revascularization. MI = myocardial infarction; CV = cardiovascular; UA = unstable angina; HR = hazard ratio; KM = Kaplan-Meier; ARR = absolute risk reduction; NNT = Number Needed to Treat

- Gencer B, et al. Poster presented at American Heart Association Scientific Sessions 2019; November 16–18, 2019, Philadelphia, PA.

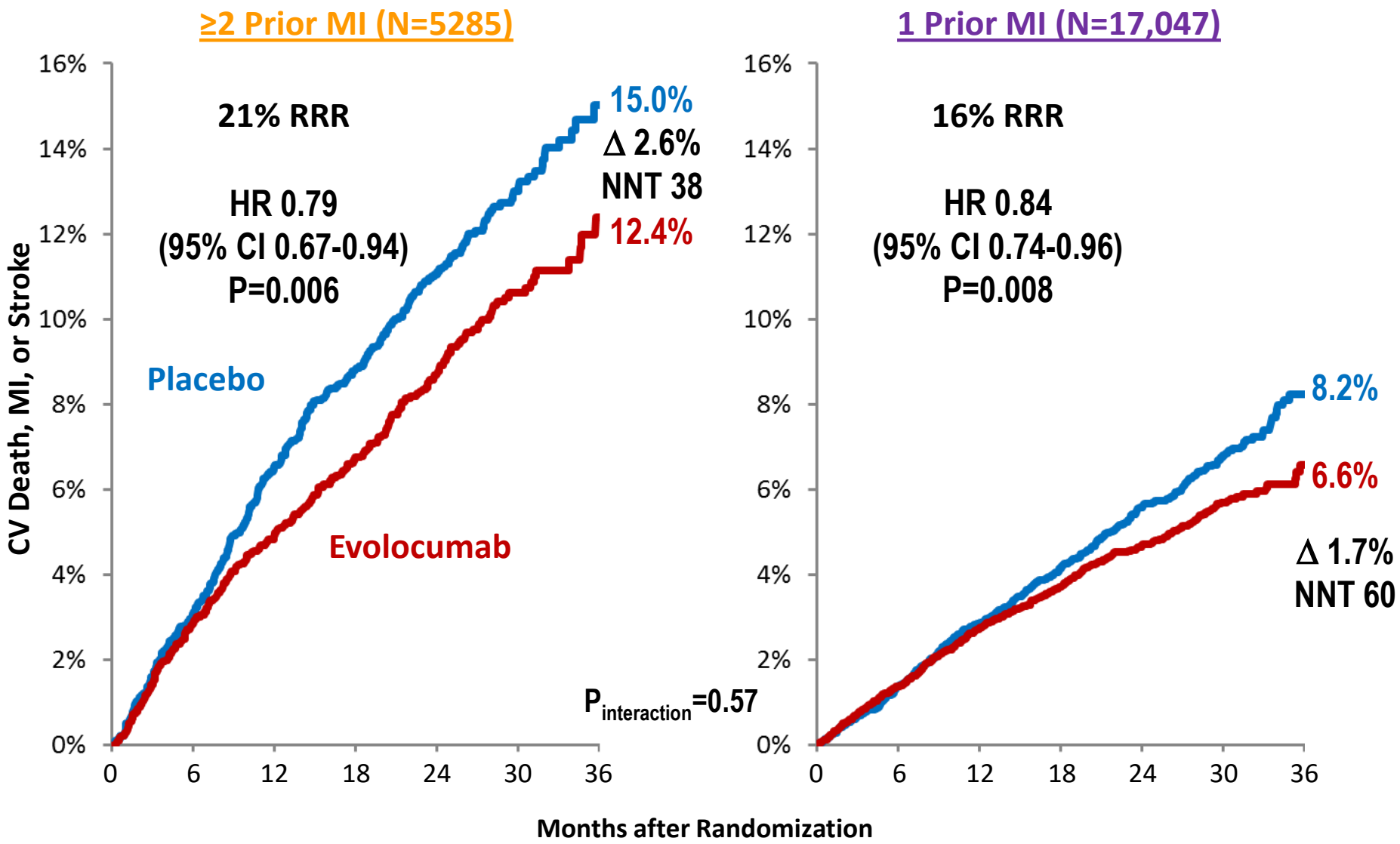
Clinical Benefit of Evolocumab by Severity and Extent of Coronary Artery Disease: An Analysis from FOURIER



PCSK9 e prevenzione secondaria nei pazienti con

- Sindrome coronarica acuta
- **IMA recente**
- **IMA ricorrente**
- Estensione della malattia coronarica
- Sottoposti a rivascolarizzazione

Benefit of EvoMab Based on # of Prior MIs



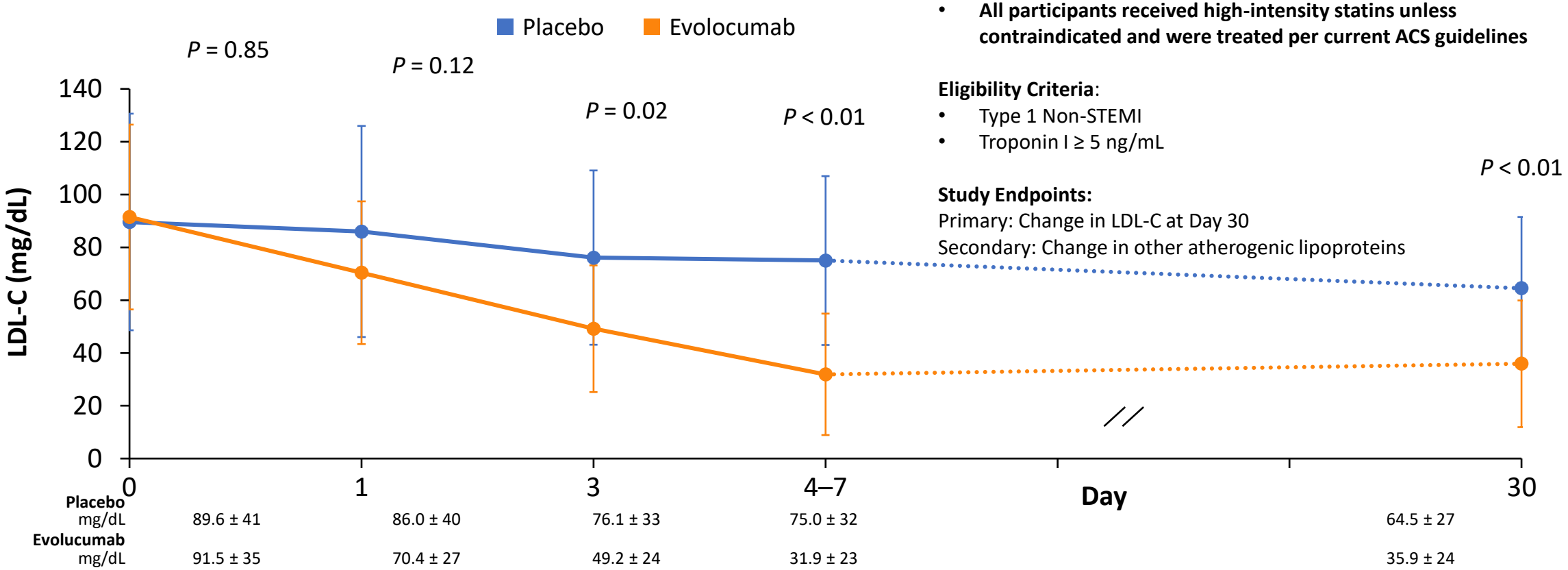
PCSK9 & SCA

Effect of Evolocumab on Atherogenic Lipoproteins During the Peri- and Early Postinfarction Period: A Placebo-Controlled, Randomized Trial *Results From the EVACS Study*

- **57 patients met eligibility criteria and were included in the study**
- **All participants received high-intensity statins unless contraindicated and were treated per current ACS guidelines**

Eligibility Criteria:
- Type 1 Non-STEMI
- Troponin I ≥ 5 ng/mL

Study Endpoints:
Primary: Change in LDL-C at Day 30
Secondary: Change in other atherogenic lipoproteins



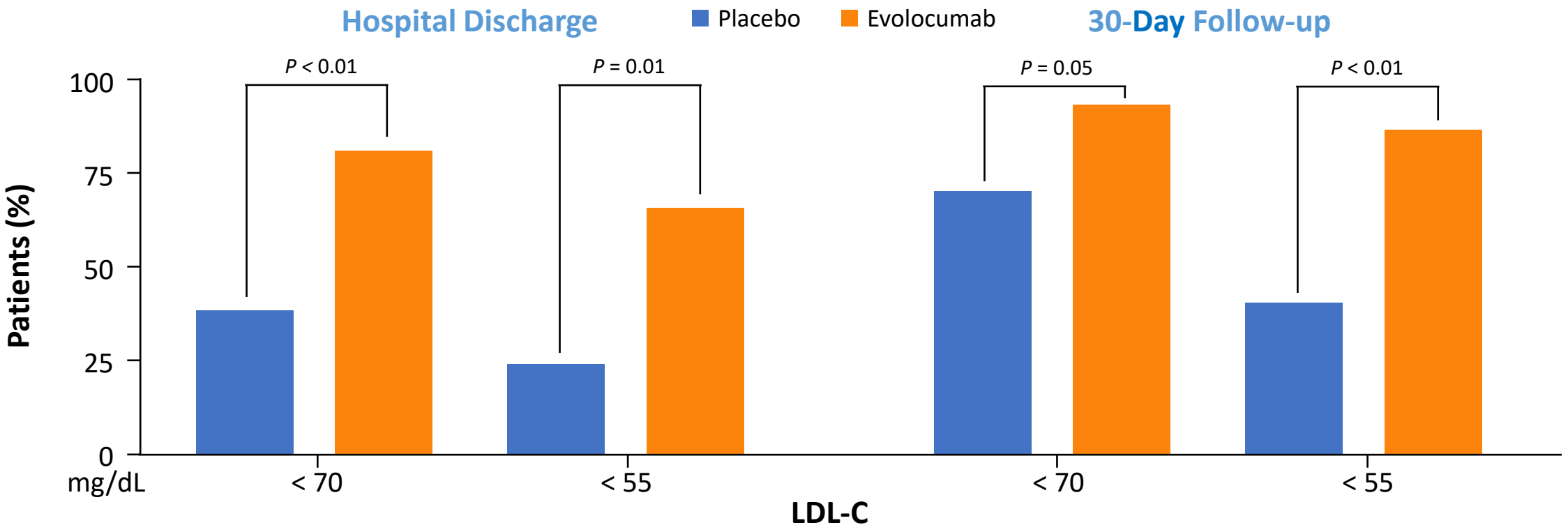
Placebo mg/dL	89.6 ± 41	86.0 ± 40	76.1 ± 33	75.0 ± 32	64.5 ± 27
Evolucumab mg/dL	91.5 ± 35	70.4 ± 27	49.2 ± 24	31.9 ± 23	35.9 ± 24

Evolocumab, added to statin therapy, significantly reduced LDL-C levels throughout hospitalization and the 30-day follow-up in comparison with the placebo group (statin alone) (35.9±24mg/dL evolocumab vs. 64.5±27 mg/dL; *P* < 0.01).

The number of patients assessed at the different time points are as follows: Baseline, 57 (evolocumab n = 30; placebo n = 27); day 1, 51 (evolocumab n = 26; placebo n = 25); day 3, 30 (evolocumab n = 16; placebo n = 14); day 4 to 7, 23 (evolocumab n = 15; placebo n = 8); day 30, 57 (evolocumab n = 30; placebo n = 27).
LDL-C = low-density lipoprotein cholesterol; SD = standard deviation.

Leucker TM, al. *Circulation.* 2020;142:419-421. et

Significantly More Patients Treated With Evolocumab Achieved AHA/ACC and ESC LDL-C Guideline Recommendations At Hospital Discharge & At 30-Day Follow-Up



At hospital discharge[a] (~Day 4), 80.8% and 65.4%, respectively, of evolocumab-treated patients achieved 2018 AHA/ACC and 2019 ESC guideline LDL recommendations compared with 38.1% and 23.8%, respectively, of placebo-treated patients

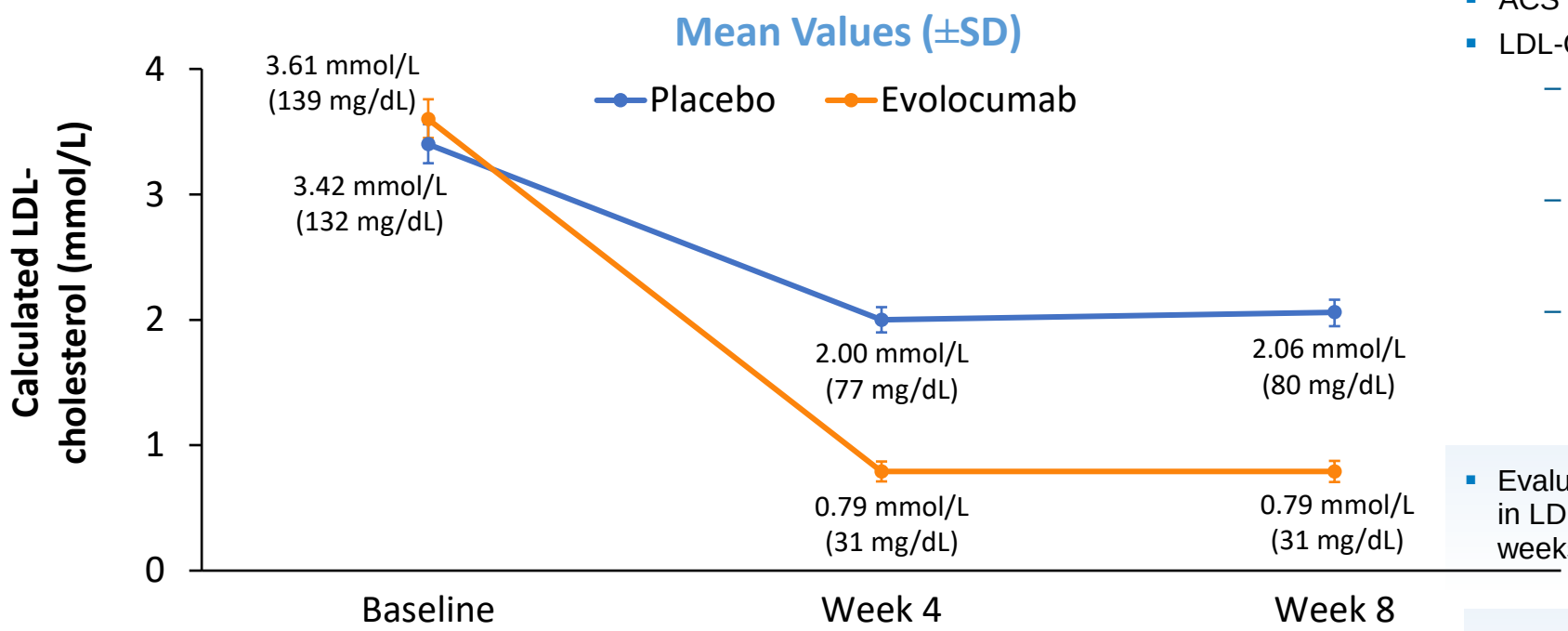
[a]The mean discharge day was 4±2 days. Discharge values were obtained within 24 hours of discharge (evolocumab n = 26; placebo n = 21).
ACC = American College of Cardiology; AHA = American Heart Association; ESC = European Society of Cardiology; LDL-C = low-density lipoprotein cholesterol.

Leucker TM, et al. *Circulation.* 2020;142:419-421.

Evolocumab for Early Reduction of LDL-Cholesterol Levels in Patients With Acute Coronary Syndromes (EVOPACS)

Majority of Patients Enrolled Were Statin-Naïve at Baseline

Primary Endpoint: Significant Reduction in LDL-C at 8 Weeks



No. of patients			
Placebo + Atorva 40 mg	148	144	149
Evolocumab 420 mg sc + Atorva 40 mg	146	136	141
Absolute difference, LS means (mmol/L)		1.34	1.43
Percentage difference		38.4%	40.7%
P-value		<0.001	<0.001

INCLUSION CRITERIA

- ACS (NSTEMI/UA < 72H, STEMI < 24H)
- LDL-C levels
  - ≥ 1.8 mmol/L (70 mg/dl) in patient previously on stable treatment with high-intensity statin OR
  - ≥ 2.3 mmol/L (90 mg/dl) in patients previously on stable treatment with low- or moderate intensity statin OR
  - ≥ 3.2 mmol/L (125 mg/dL) in statin naive patients or patients not on stable statin treatment

PRIMARY OBJECTIVE

- Evaluate effectiveness of evolocumab vs placebo in LDL-C reduction in acute phase of ACS after 8 weeks

SECONDARY OBJECTIVE

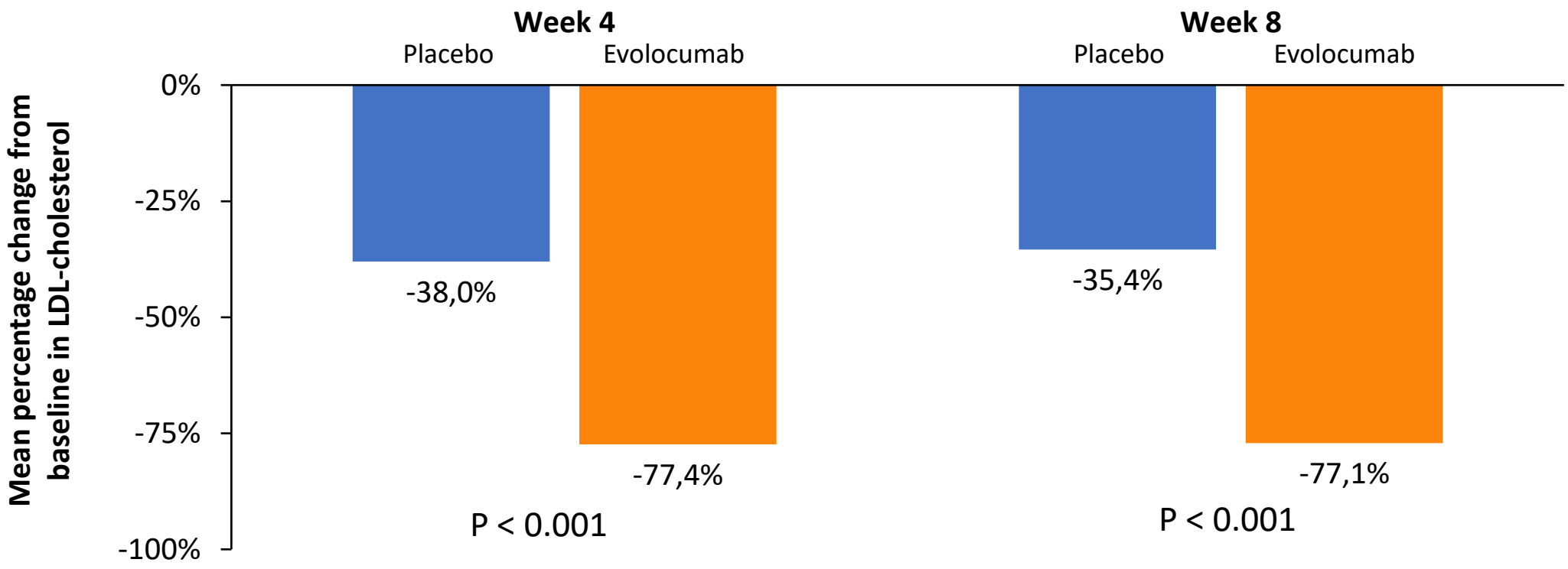
- To assess safety and tolerability of early evolocumab administration in acute phase of ACS

The reduction in LDL-C levels was evident at 4 weeks and maintained at 8 weeks

AE, adverse event; LS = least-squares; LDL-C = low-density lipoprotein cholesterol; SD = standard deviation .

Koskinas KC, et al. *JACC*. [published online ahead of print August 31, 2019]. https://doi.org/10.1016/j.jacc.2019.08.010

Percent Change in LDL-C at 4 Weeks Was Maintained at Week 8



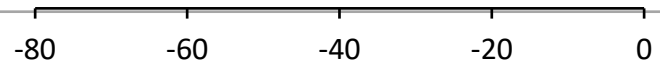
The percent change in LDL-C from baseline to week 8 was 77% in the evolocumab group and 35% in the placebo group

AE, adverse event; LS = least-squares; LDL-C = low-density lipoprotein cholesterol; SD = standard deviation

Koskinas KC, et al. *JACC*. [published online ahead of print August 31, 2019]. https://doi.org/10.1016/j.jacc.2019.08.010

Subgroup Analysis by Statin Treatment at Baseline Demonstrates the Impact of No Prior Statin Therapy on Percent Reduction in LDL-C Between Groups

	Evolocumab (N = 155)		Placebo (N = 152)		Calculated LDL-C Mean Difference (95% CI)	P-value	Interaction P-value
	n	Mean ± SD	n	Mean ± SD			
Overall	132	-77.1 ± 15.8	145	-35.4 ± 26.6	-40.7 (-45.2 to -36.2)	<0.001	
Statin at baseline							<0.001
Yes	26	-63.9 ± 24.8	34	-8.1 ± 30.8	-55.8 (-70.1 to -41.6)	<0.001	
No	106	-80.3 ± 10.5	111	-43.8 ± 18.5	-36.5 (40.5 to -32.5)	<0.001	



Subgroup analyses showed a greater percent reduction in calculated LDL-C with evolocumab vs placebo among patients who had been on statin therapy at baseline

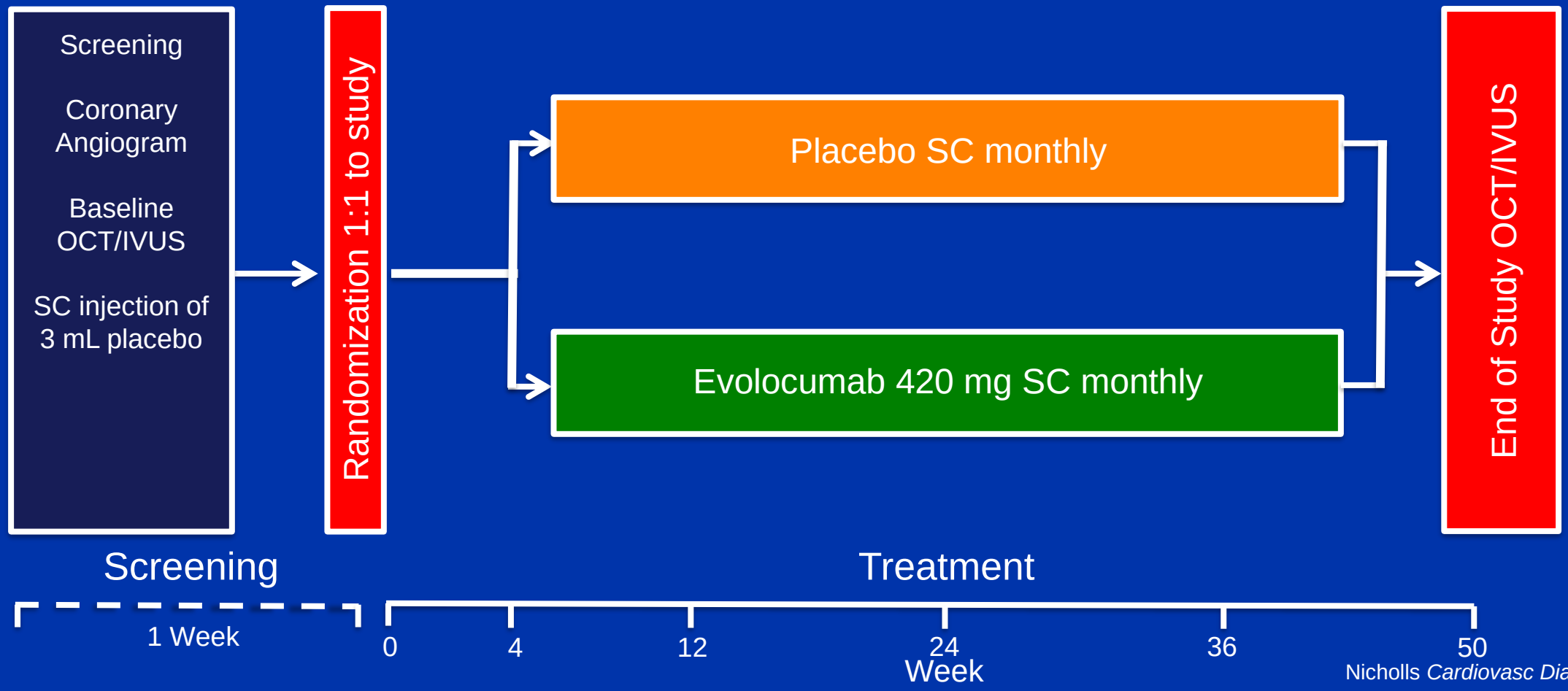
Shown are means ± standard deviations (p-value from mixed models), interaction p-value testing for the interaction effect subgroup x randomized arm from full-factorial mixed model. Stratification for baseline statin treatment was done according to presence or absence of stable (unchanged) statin treatment in the preceding 4 weeks prior to enrollment.

LDL-C = low-density lipoprotein cholesterol

Koskinas KC, et al. *JACC*. [published online ahead of print August 31, 2019]. https://doi.org/10.1016/j.jacc.2019.08.010

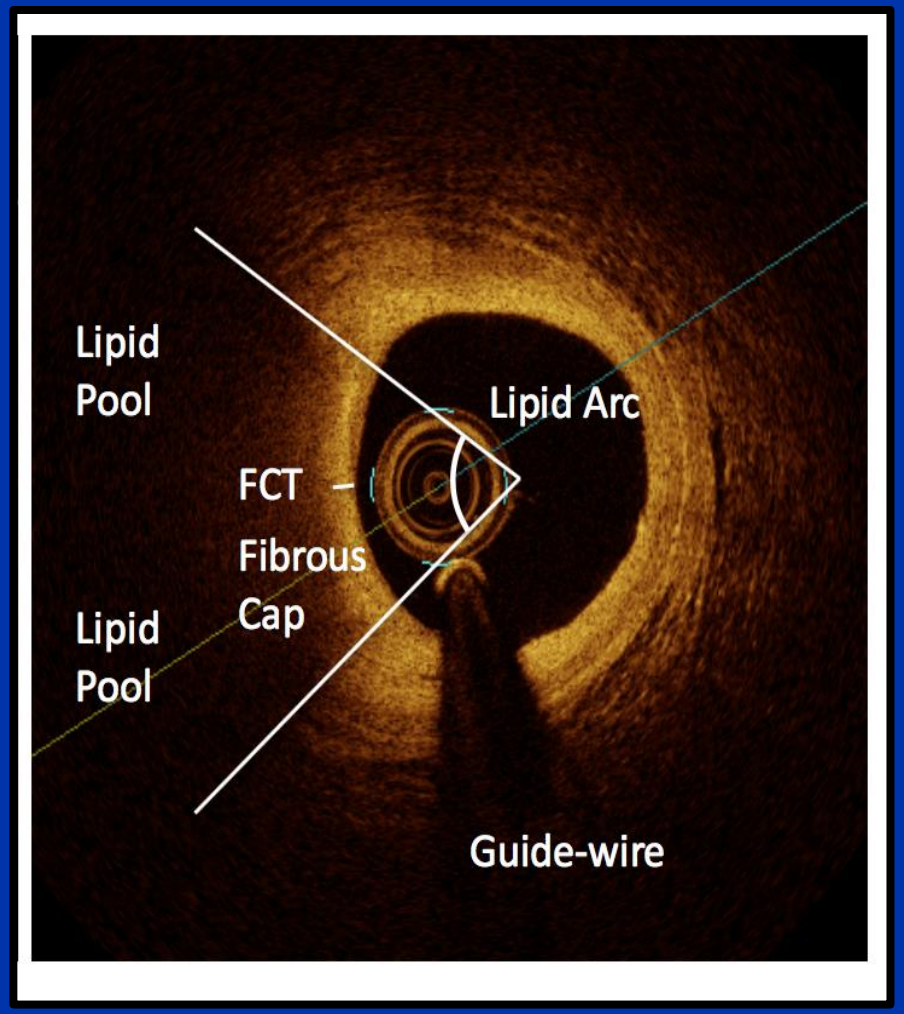
Assessing the Impact of PCSK9 Inhibition on Coronary Plaque Phenotype with Optical Coherence Tomography: Primary results of the HUYGENS Study

161 patients with (i) NSTEMI, (ii) angiographic CAD, (iii) LDL-C ≥60 mg/dL on high-intensity, ≥80 mg/dL on low/moderate-intensity or ≥130 mg/dL on no statin at screening, (iv) subsequently treated with maximally tolerated statin and (v) target segment on OCT containing at least one image with a FCT <120 μm and one image with lipid arc >90°



Nicholls *Cardiovasc Diag Ther* 2021

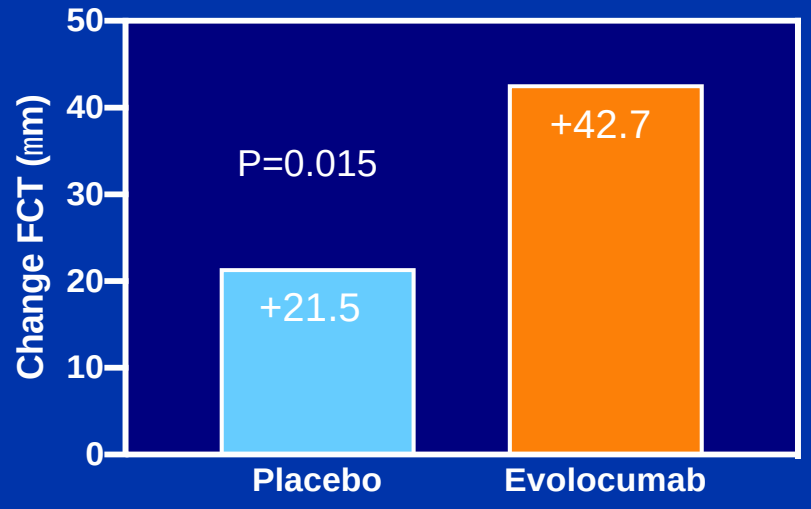
Imaging Analysis



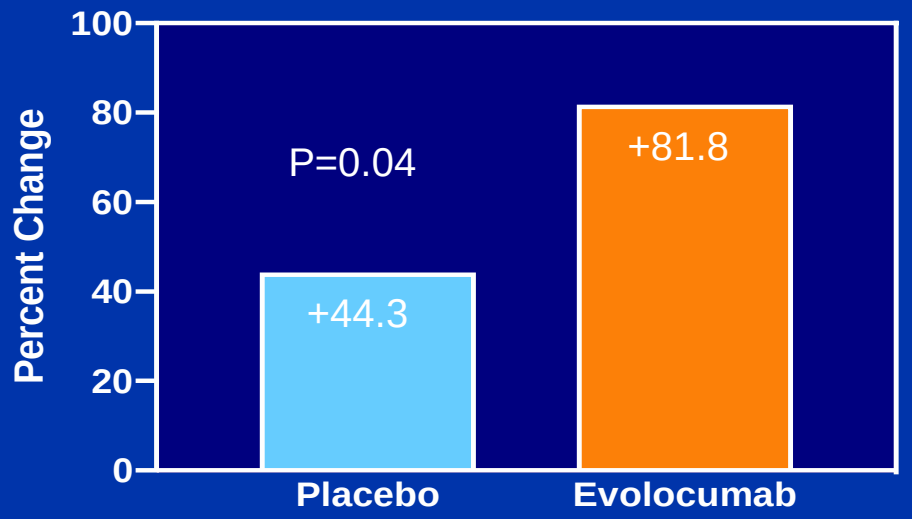
- OCT analysis on images 0.2-mm apart in a segment defined by proximal and distal side branches
- Primary endpoint: change in minimum FCT anywhere in the segment
- Secondary endpoints
  - Percent change in minimum FCT
  - Change in average minimum FCT
  - Change in maximum lipid arc
- Plaque analysis: regions containing FCT $\leq 120\mu m$ and lipid arc $>90^{o}$ for ≥ 3 consecutive images

HUYGENS Primary Endpoint:

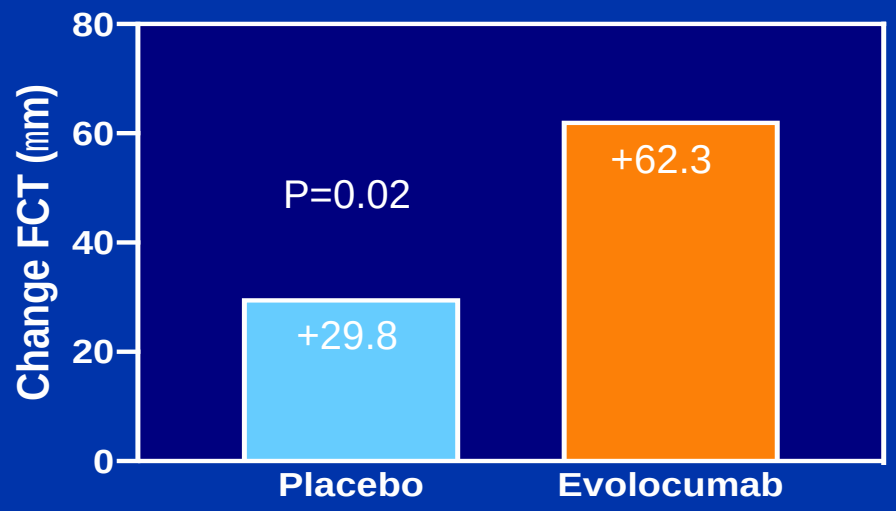
Minimum Fibrous Cap Thickness



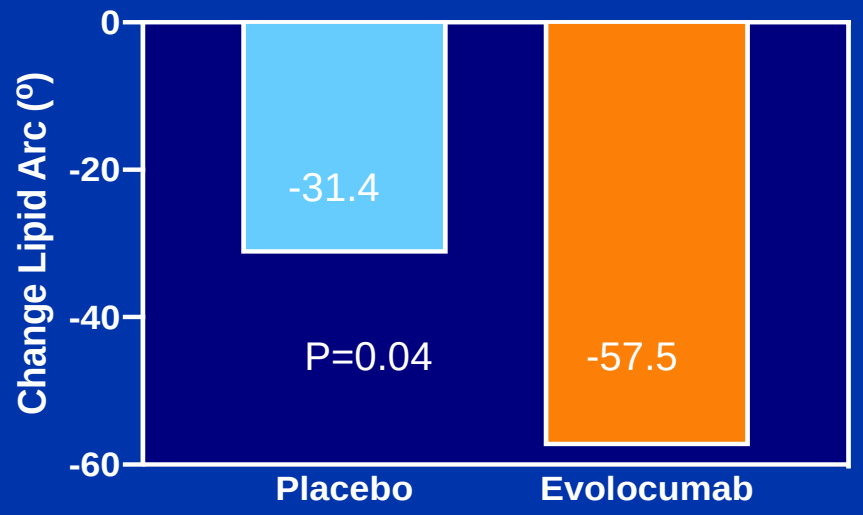
Percent Change Minimum Fibrous Cap Thickness



Mean Minimum Fibrous Cap Thickness



Maximum Lipid Arc

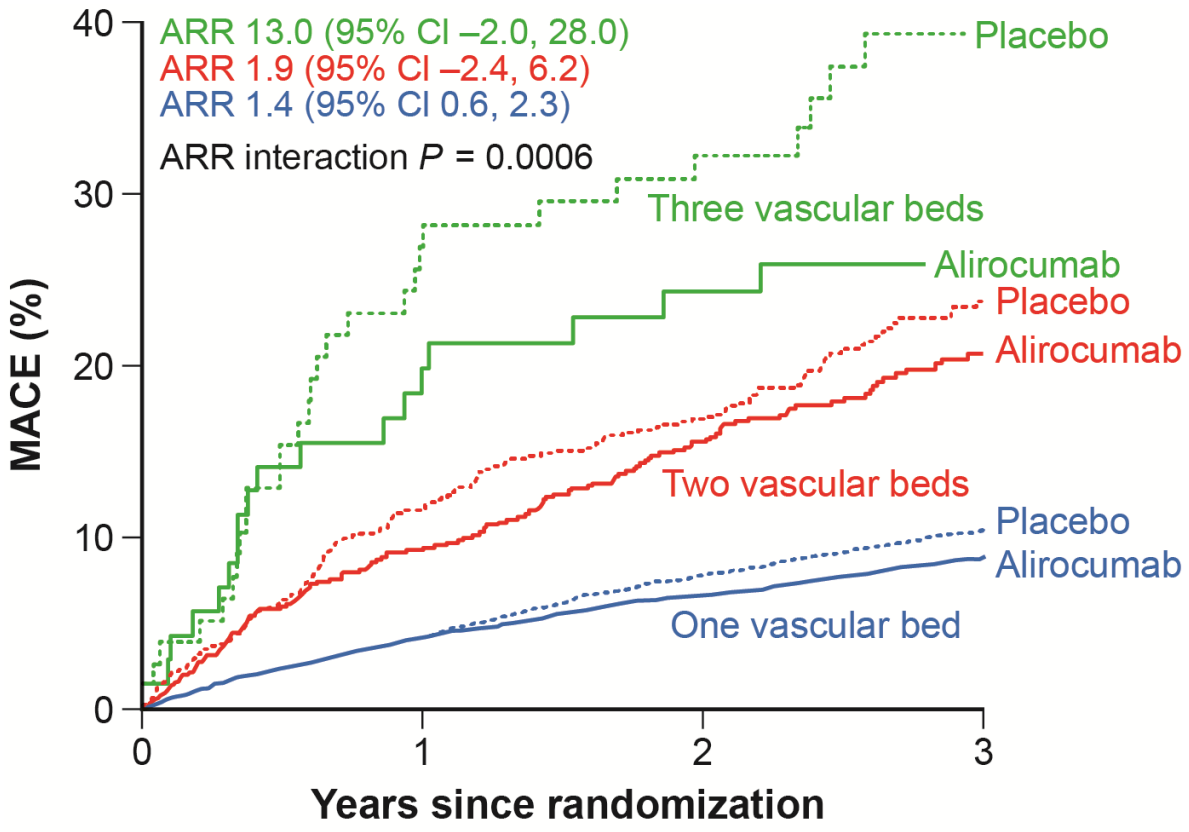


PCSK9 e prevenzione secondaria nei pazienti con

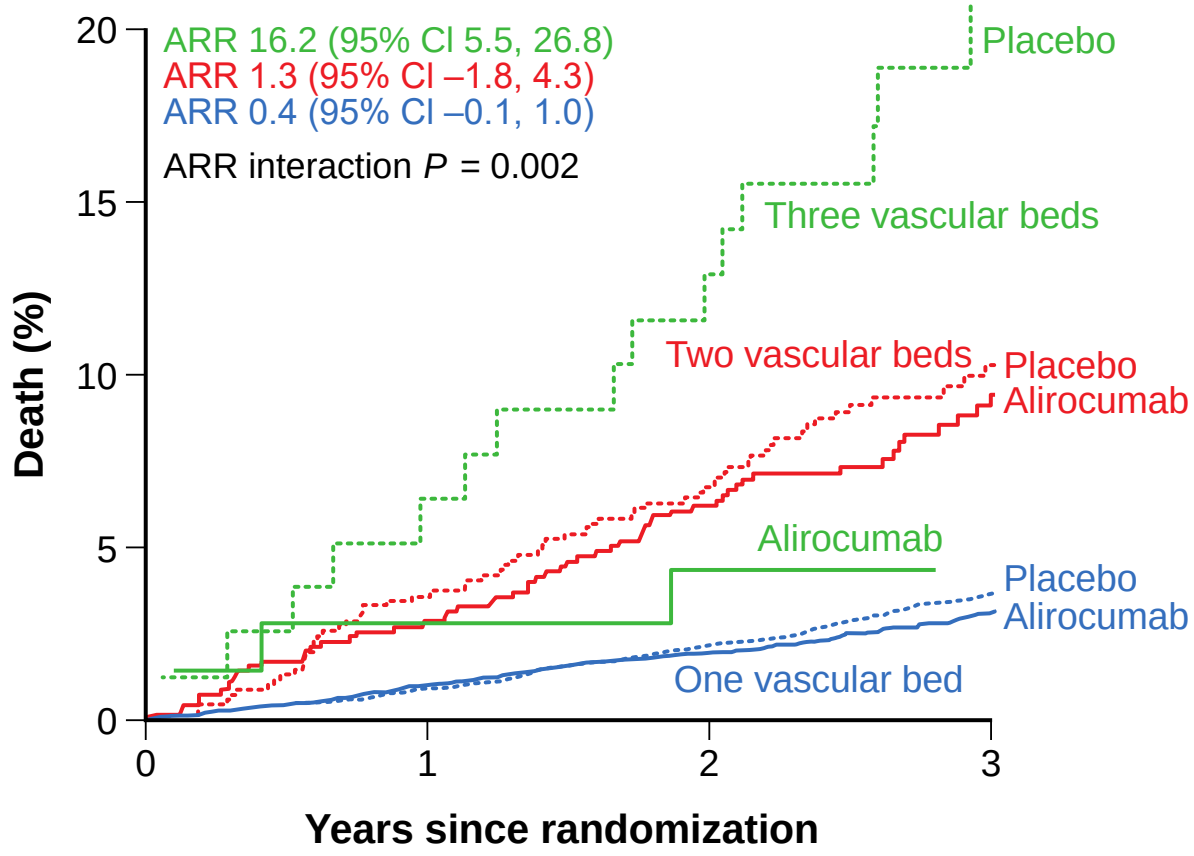
- Sindrome coronarica acuta
- **IMA recente**
- **IMA ricorrente**
- **Estensione della malattia coronarica**
- Sottoposti a rivascolarizzazione

Post-Acute Coronary Syndrome Patients With Polyvascular Disease Derive Large Absolute Benefit From Alirocumab: ODYSSEY OUTCOMES

MACE: one, two or three vascular beds

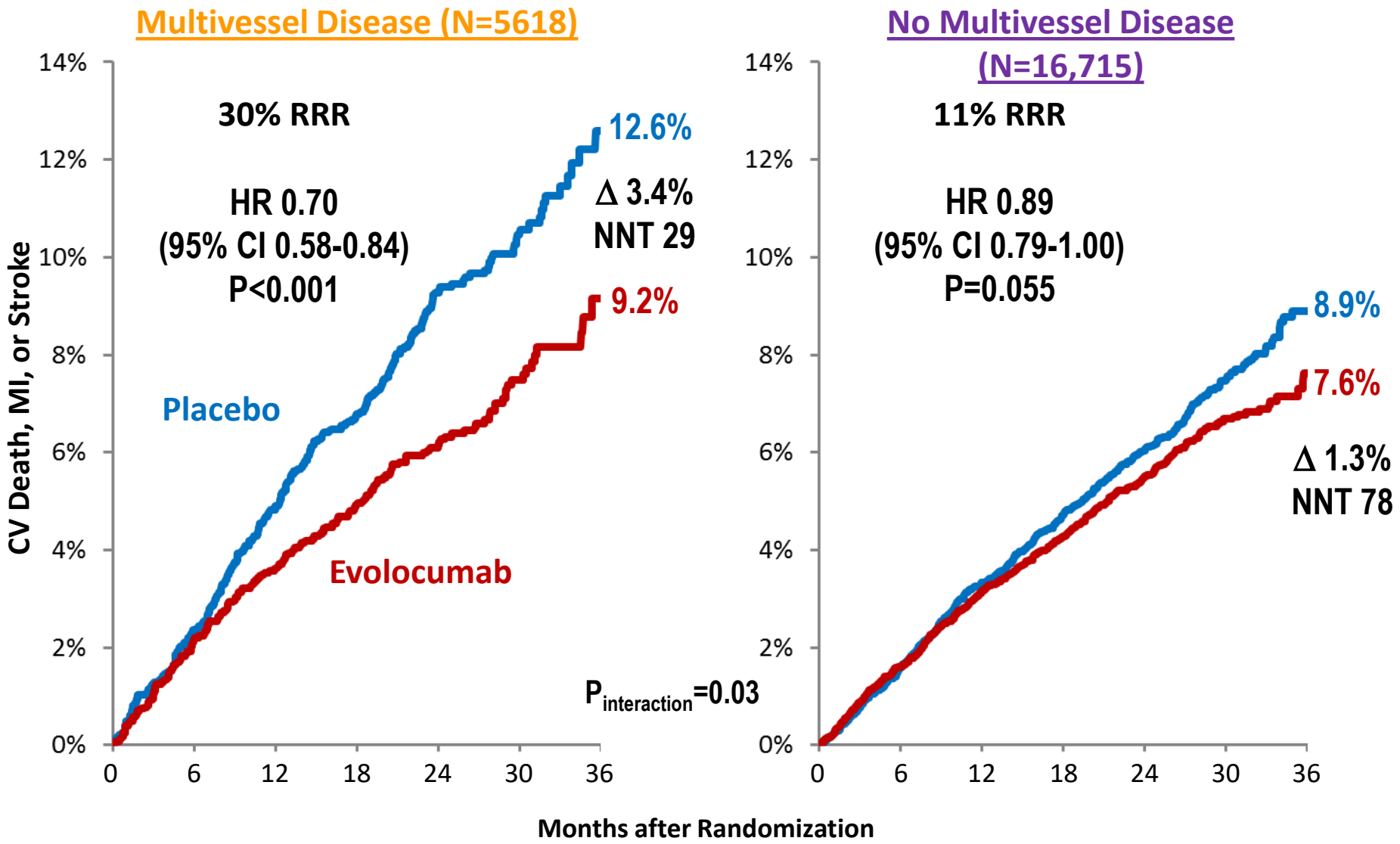


Death: one, two or three vascular beds



JUKEMA , JACC VOL. 74, NO. 9, 2019 SEPTEMBER 3, 2019:1167 – 76

Benefit of EvoMab Based on Multivessel Disease



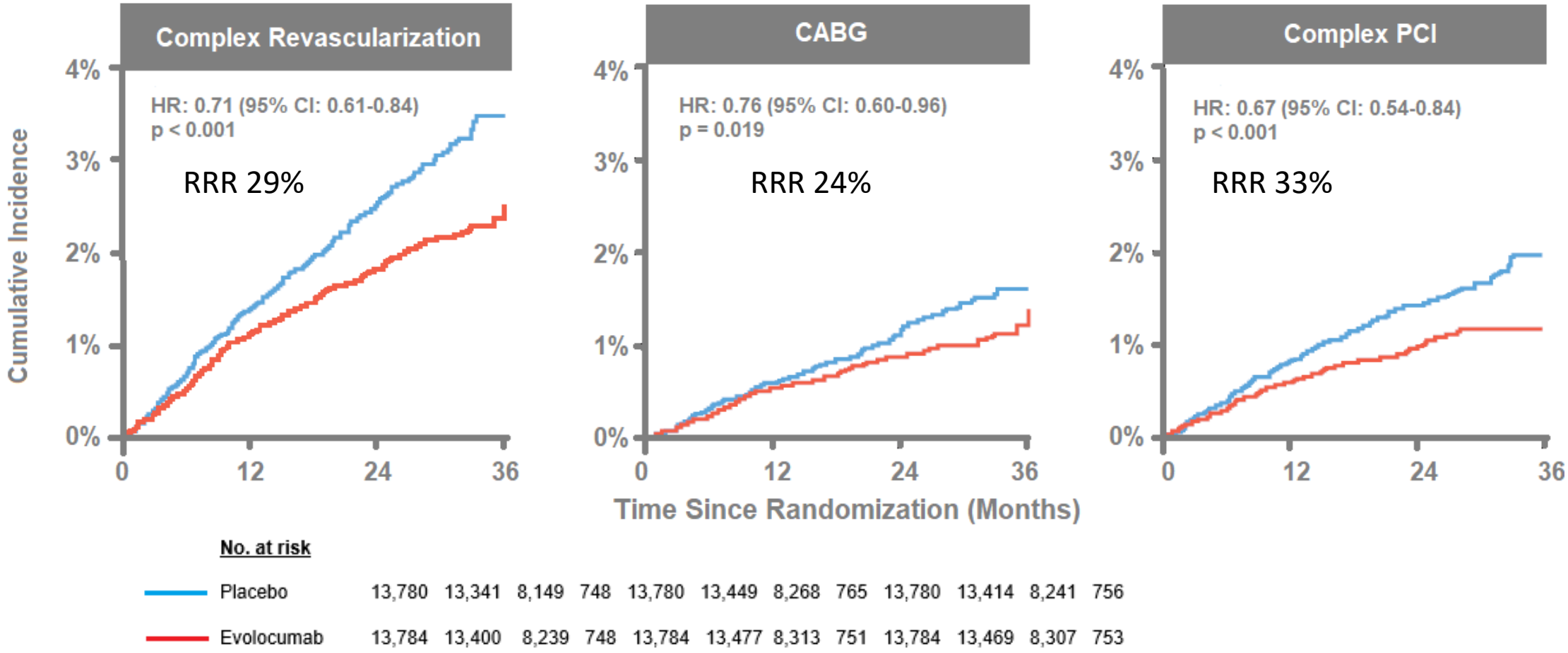
PCSK9 e prevenzione secondaria nei pazienti con

- IMA recente
- IMA ricorrente
- Estensione della malattia coronarica
- **Sottoposti a rivascolarizzazione**
- Sindrome coronarica acuta

Effect of Evolocumab on Complex Coronary Disease Requiring Revascularization

post hoc analyses

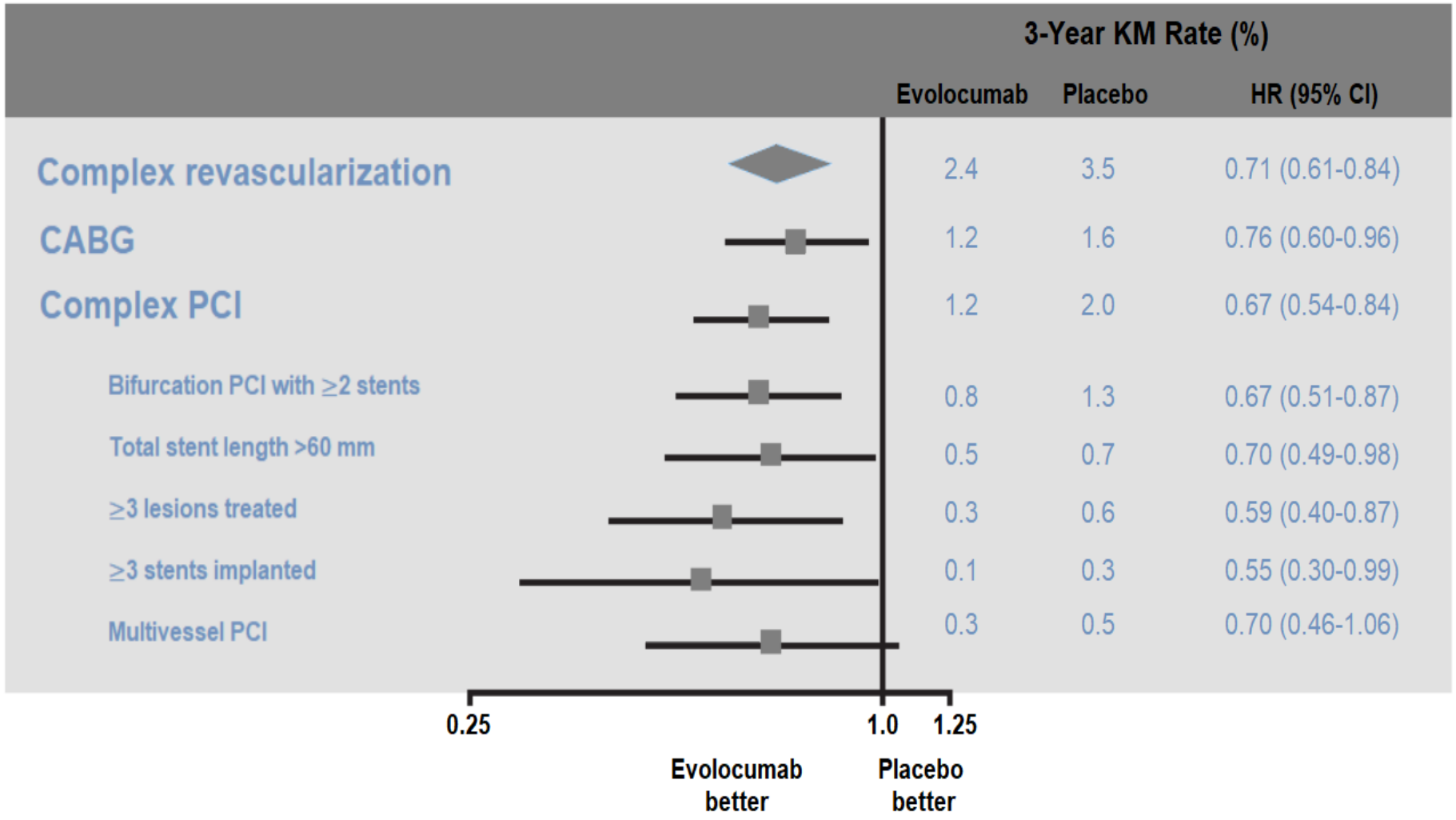
Evolocumab reduced the risk of any coronary revascularization by 22%



* Coronary Artery Bypass Gratting Surgery
\# Percutaneous Coronary Intervention

Oyama, K. et al. J Am Coll Cardiol. 2021;77(3):259–67.

Effect of Evolocumab on Complex Coronary Disease Requiring Revascularization

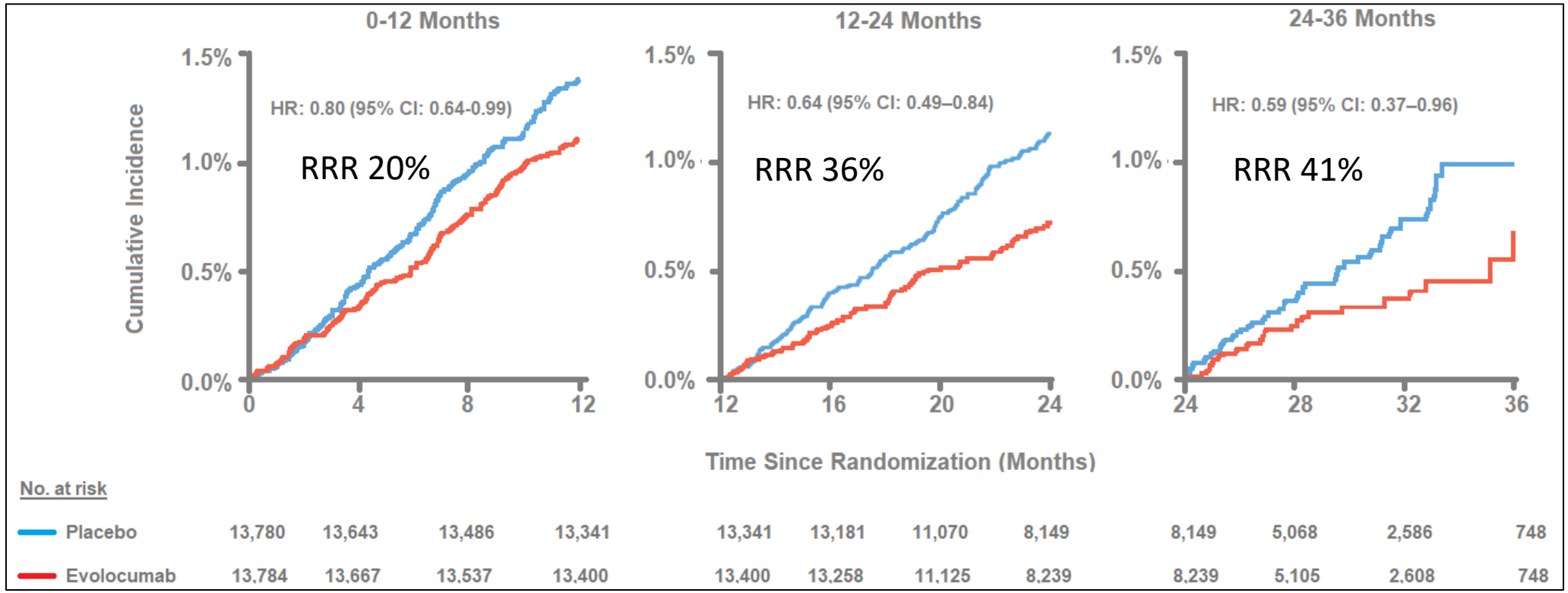


* Coronary Artery Byp
# Percutaneous Coronary Intervention

Oyama, K. et al. J Am Coll Cardiol. 2021;77(3):259–67.

Effect of Evolocumab on Complex Coronary Disease Requiring Revascularization

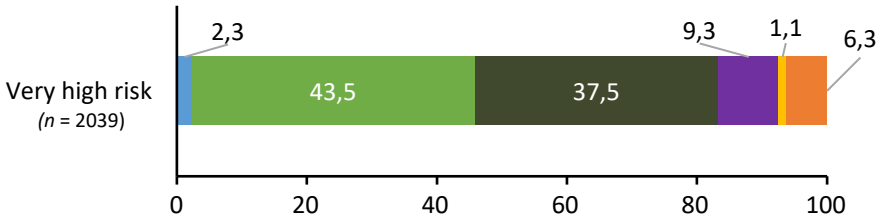
Relative Risk Reduction increase over time

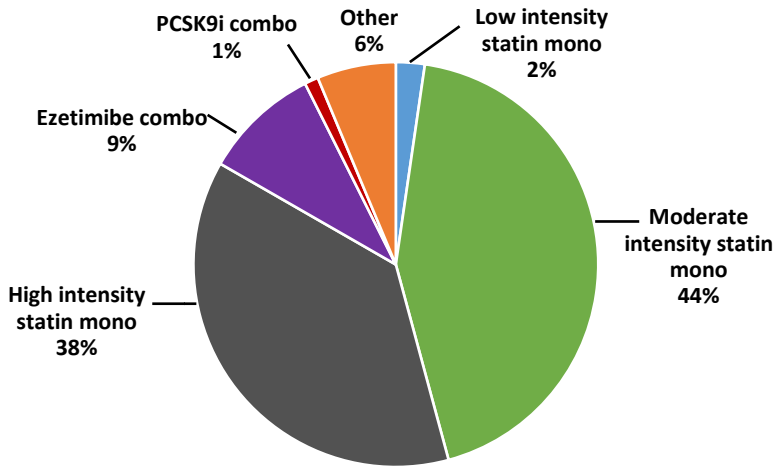


Oyama, K. et al. J Am Coll Cardiol. 2021;77(3):259–67.

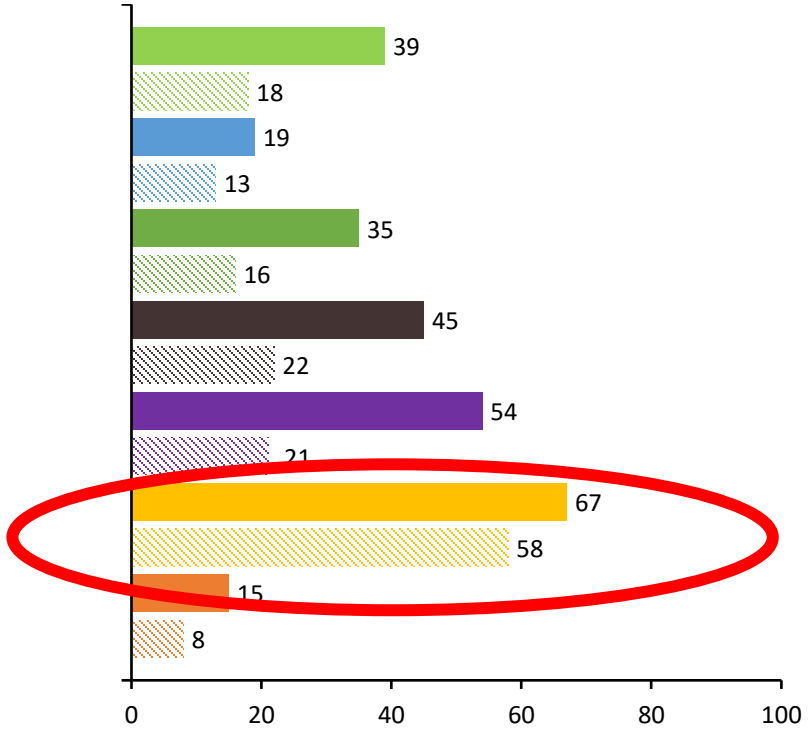
In Very High Risk Patients with Established ASCVD, Goal Attainment was More Likely Seen in those Receiving Combination Therapy

Proportion of Patients Receiving LLT (%)





Proportion of Patients Achieving Goal (%)



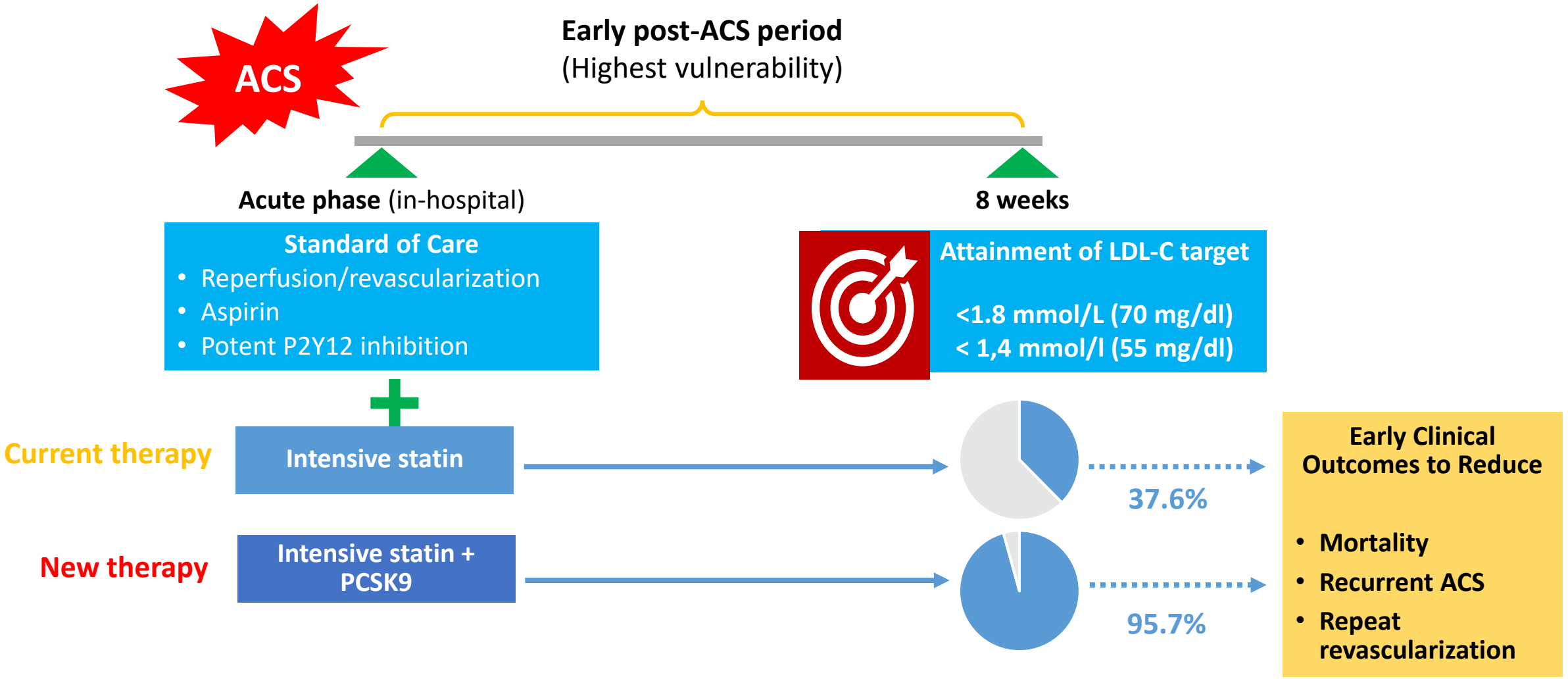
Overall (*n* = 2039)
Low-intensity statin monotherapy (*n* = 47)
Moderate-intensity statin monotherapy (*n* = 887)
High-intensity statin monotherapy (*n* = 764)
Ezetimibe combination (*n* = 189)
PCSK9i combination (*n* = 24)
Other LLT (*n* = 128)

2016/2019 risk-based LDL-C targets:
Low risk: 2016/2019, < 3.0 mmol/L (< 116 mg/dL);
Moderate risk: 2016, < 3.0 mmol/L (< 116 mg/dL); 2019, < 2.6 mmol/L (< 101 mg/dL); High risk: 2016, < 2.6 mmol/L (< 100 mg/dL); 2019, < 1.8 mmol/L (< 70 mg/dL); Very high risk: 2016, < 1.8 mmol/L (< 70 mg/dL); 2019, < 1.4 mmol/L (< 55 mg/dL)

ASCVD = atherosclerotic cardiovascular disease; CV = cardiovascular; LDL-C = low-density lipoprotein cholesterol; LLT = lipid-lowering therapy; PCSK9i = proprotein convertase subtilisin/kexin type 9 inhibitor.
N is the number of patients in the category with non-missing LDL-C goal data. Patients enrolled as secondary prevention whose first ASCVD event occurred after the date LDL-C levels were stabilised are included in the primary prevention group. Among patients enrolled as secondary prevention, 142 had their first CV event recorded after their most recent LDL-C measurement, hence they were analysed as primary prevention patients for outcomes assessed at LDL-C measurement, such as goal attainment. For outcomes assessed at enrollment, these 142 patients were analysed as secondary prevention.

Ray, KK, et al. *Eur J Prev Cardiol*. 2020. doi:10.1093/eurjpc/zwaa047.

ACS Phase and New Treatment Paradigms to Consider



LA RIMBORSABILITA' DEGLI ANTI-PCSK9 IN PREVENZIONE SECONDARIA

I criteri di rimborsabilità per la prescrizione degli iPCSK9 prevedono:

- Ai pazienti di età ≤80 aa con ipercolesterolemia familiare eterozigote o ipercolesterolemia non familiare o dislipidemia mista con livelli di **C-LDL ≥100 mg/dL** nonostante terapia da almeno 6 mesi con statina ad alta potenza alla massima dose tollerata + ezetimibe oppure con dimostrata intolleranza alle statine.

- In associazione alla dose massima di statina con o senza altre terapie ipolipemizzanti

- In monoterapia o in associazione ad altre terapie ipolipemizzanti in pazienti intolleranti alle statine o per i quali l'uso delle statine è controindicato

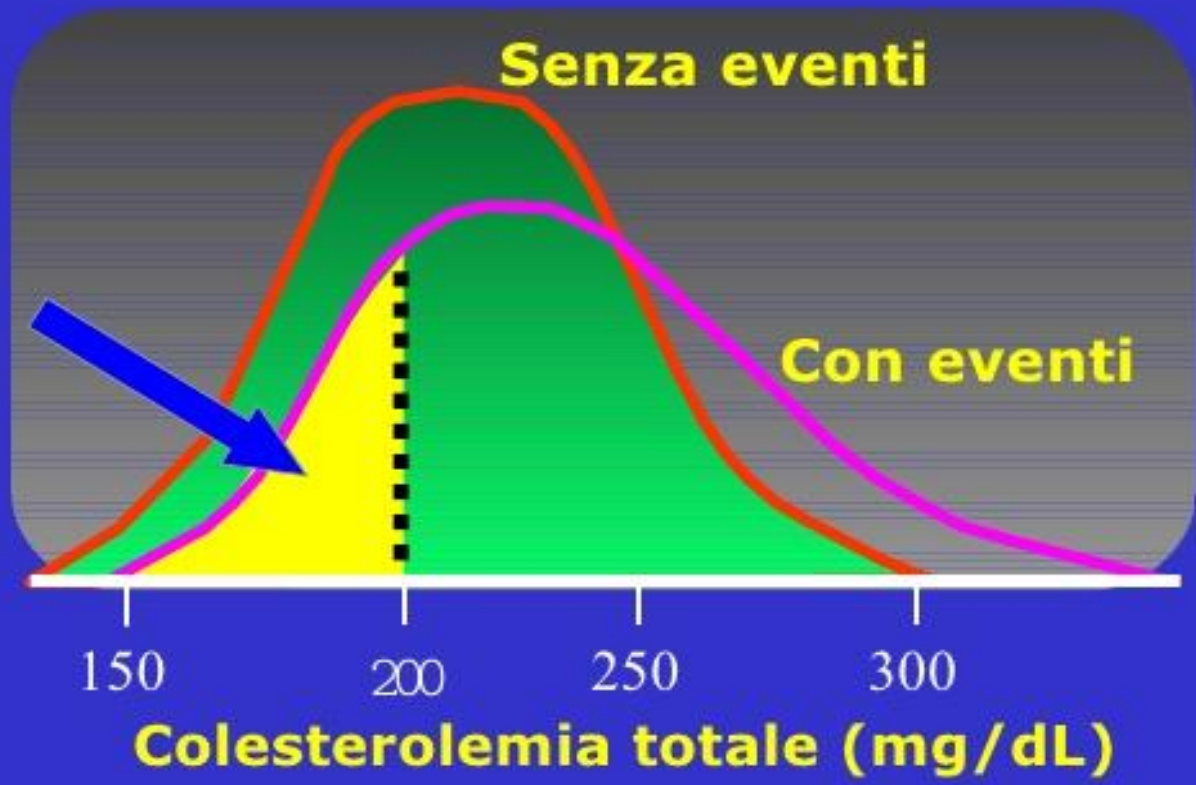
Sono oggi eleggibili al trattamento con una sola rilevazione di C-LDL:

- Recente IMA (entro 12 mesi)
- Storia di eventi cardiovascolari multipli

Distribuzione del colesterolo totale:
Pazienti con e senza eventi coronarici

Framingham Heart Study—26 anni di Follow-up

Il 35% degli eventi coronarici si verifica in pazienti con TC < 200 mg/dL



Castelli WP. Atherosclerosis. 1996;124(suppl):S1-S9.

Effect of Statin Use Within the First 24 Hours of Admission for Acute Myocardial Infarction on Early Morbidity and Mortality†

All Acute Myocardial Infarction

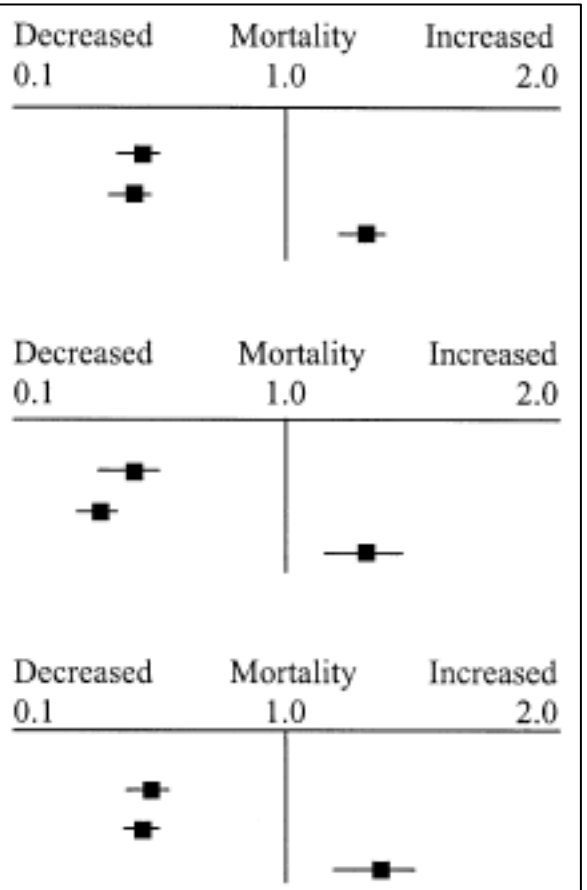
	Odds Ratio (95% CI)
Yes/Yes	0.46 (0.42-0.50)
No/Yes	0.42 (0.38-0.45)
Yes/No	1.25 (1.15-1.36)

ST Segment Elevation Myocardial Infarction

	Odds Ratio (95% CI)
Yes/Yes	0.40 (0.33-0.48)
No/Yes	0.32 (0.27-0.37)
Yes/No	1.25 (1.07-1.45)

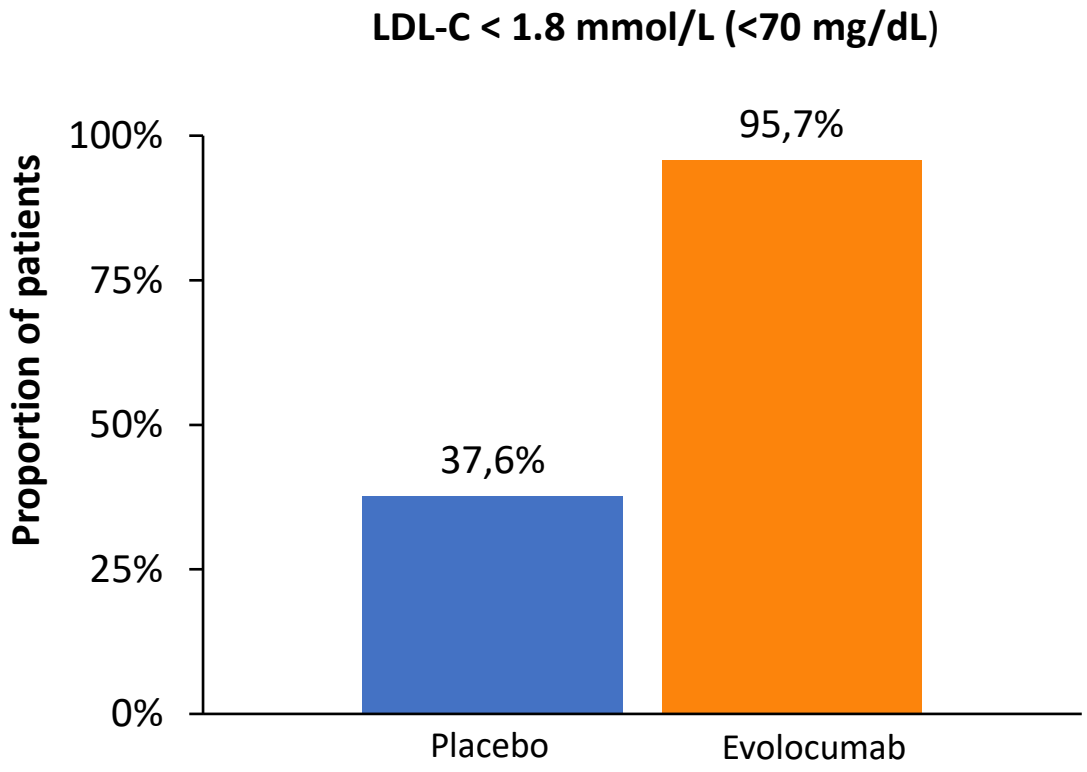
Non-ST Segment Elevation Myocardial Infarction

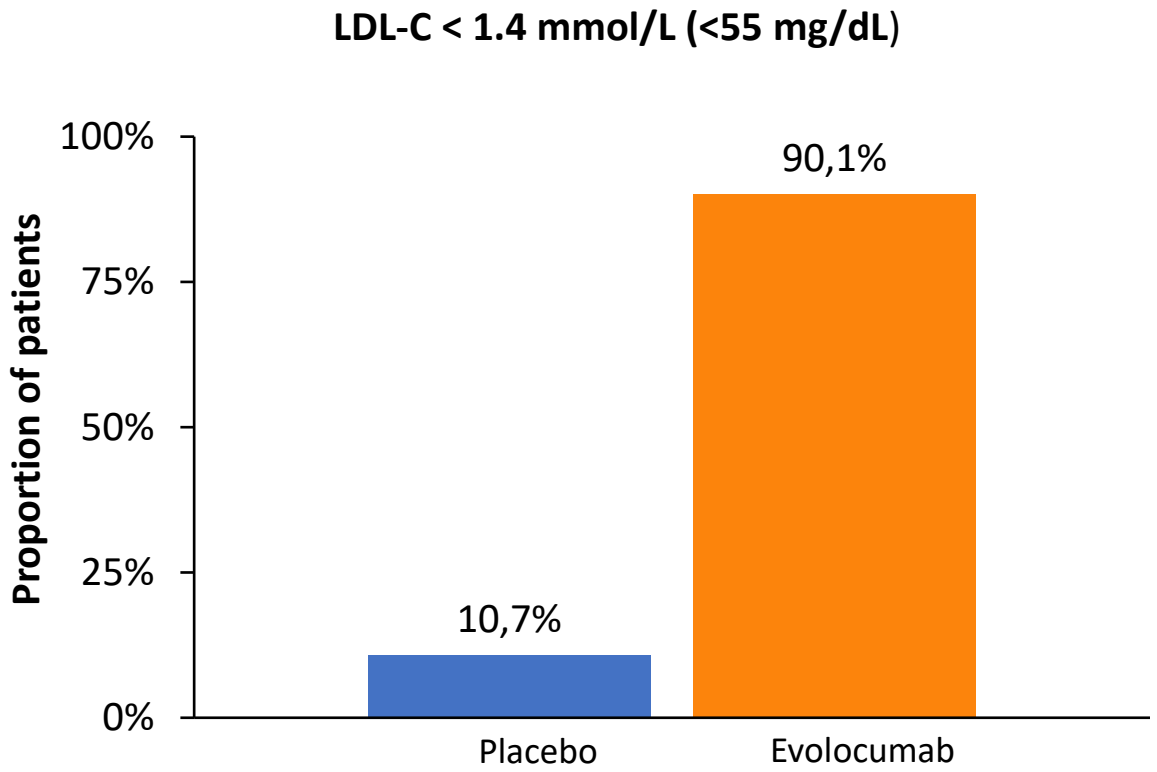
	Odds Ratio (95% CI)
Yes/Yes	0.49 (0.44-0.54)
No/Yes	0.47 (0.42-0.52)
Yes/No	1.30 (1.18-1.45)



Am J Cardiol 2005;96:611–616

90% of Evolocumab Patients Achieved New ESC/EAS Guideline Goal of LDL-C < 1.4 mmol/L (< 55 mg/dL)





Compared with placebo, substantially more patients receiving evolocumab were able to achieve LDL-C levels < 1.8 (96% vs 38%) and < 1.4 mmol/L (90% vs 11%)

LDL-C = low-density lipoprotein cholesterol

Koskinas KC, et al. ESC 2019, Paris Aug 31-Sept 4.
Koskinas KC, et al. *JACC.* [published online ahead of print August 31, 2019]. https://doi.org/10.1016/j.jacc.2019.08.010
Mach F. et al. *Eur J Heart.* [published online ahead of print August 31, 2019]. https://doi.org/10.1093/eurheartj/ehz455