

Angioplastia de Múltiples Vasos

en el Siglo XXI:

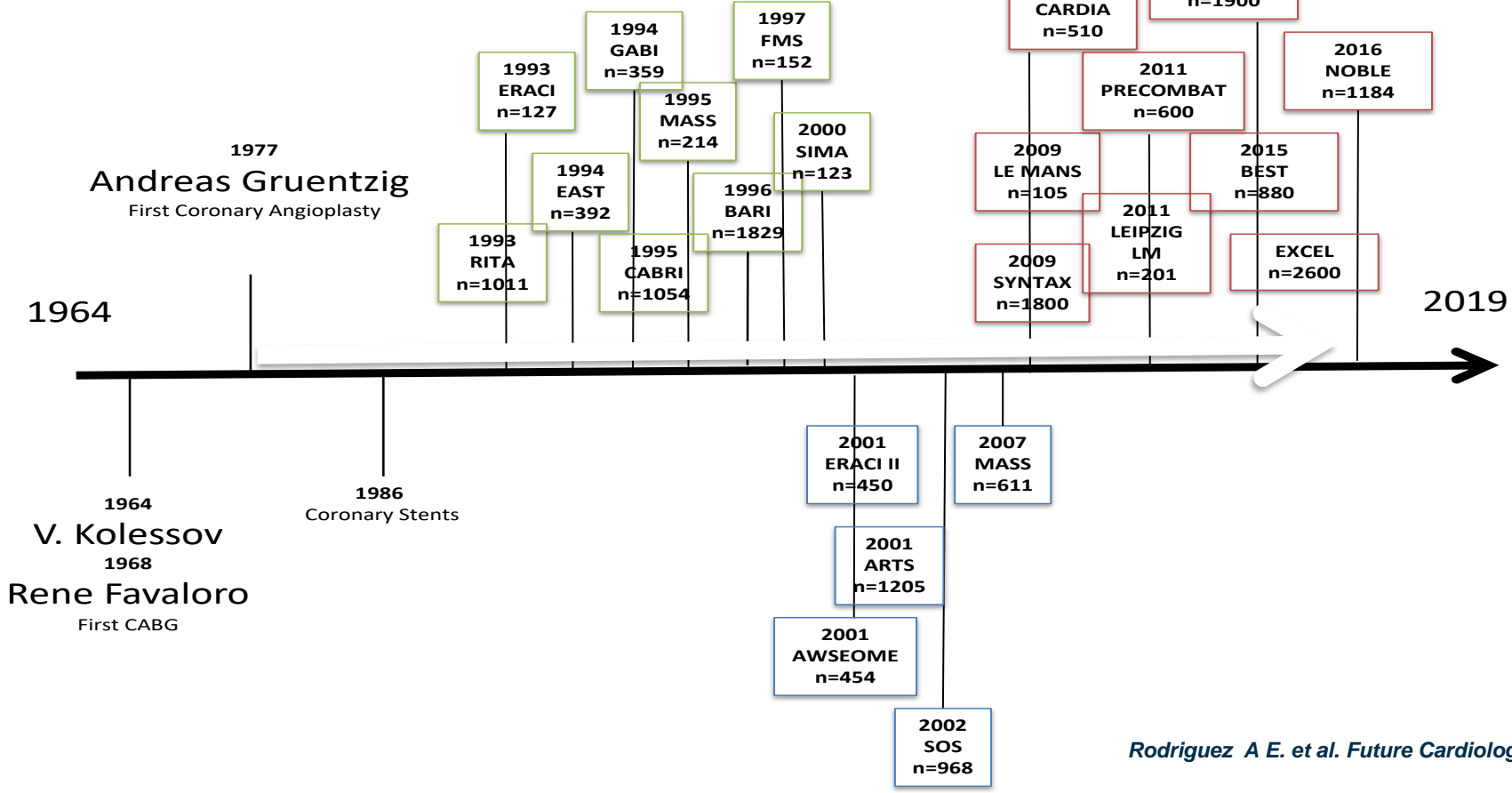
¿Qué nos pasa?



RCTs PCI vs CABG

BALLOON ANGIOPLASTY VS CABG

DES VS CABG



Rodriguez A E. et al. Future Cardiology 2020

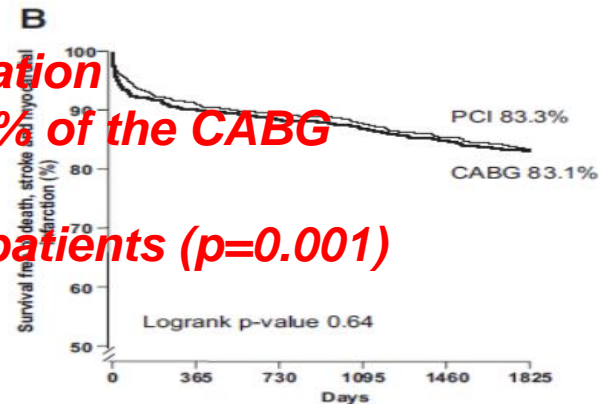
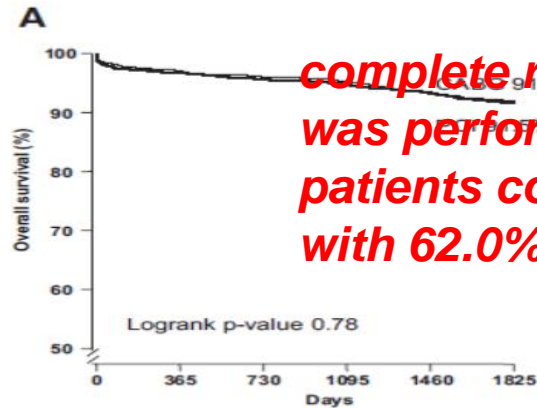
BMS VS CABG

Long-Term Safety and Efficacy of Percutaneous Coronary Intervention With Stenting and Coronary Artery Bypass Surgery for Multivessel Coronary Artery Disease

A Meta-Analysis With 5-Year Patient-Level Data From the ARTS, ERACI-II, MASS-II, and SoS Trials

Joost Daemen, MD; Eric Boersma, PhD; Marcus Flather, MBBS; Jean Booth, MSc; Rod Stables, MA, DM, FRCP; Alfredo Rodriguez, MD; Gaston Rodriguez-Granillo, MD, PhD; Whady A. Hueb, MD; Pedro A. Lemos, MD, PhD; Patrick W. Serruys, MD, PhD

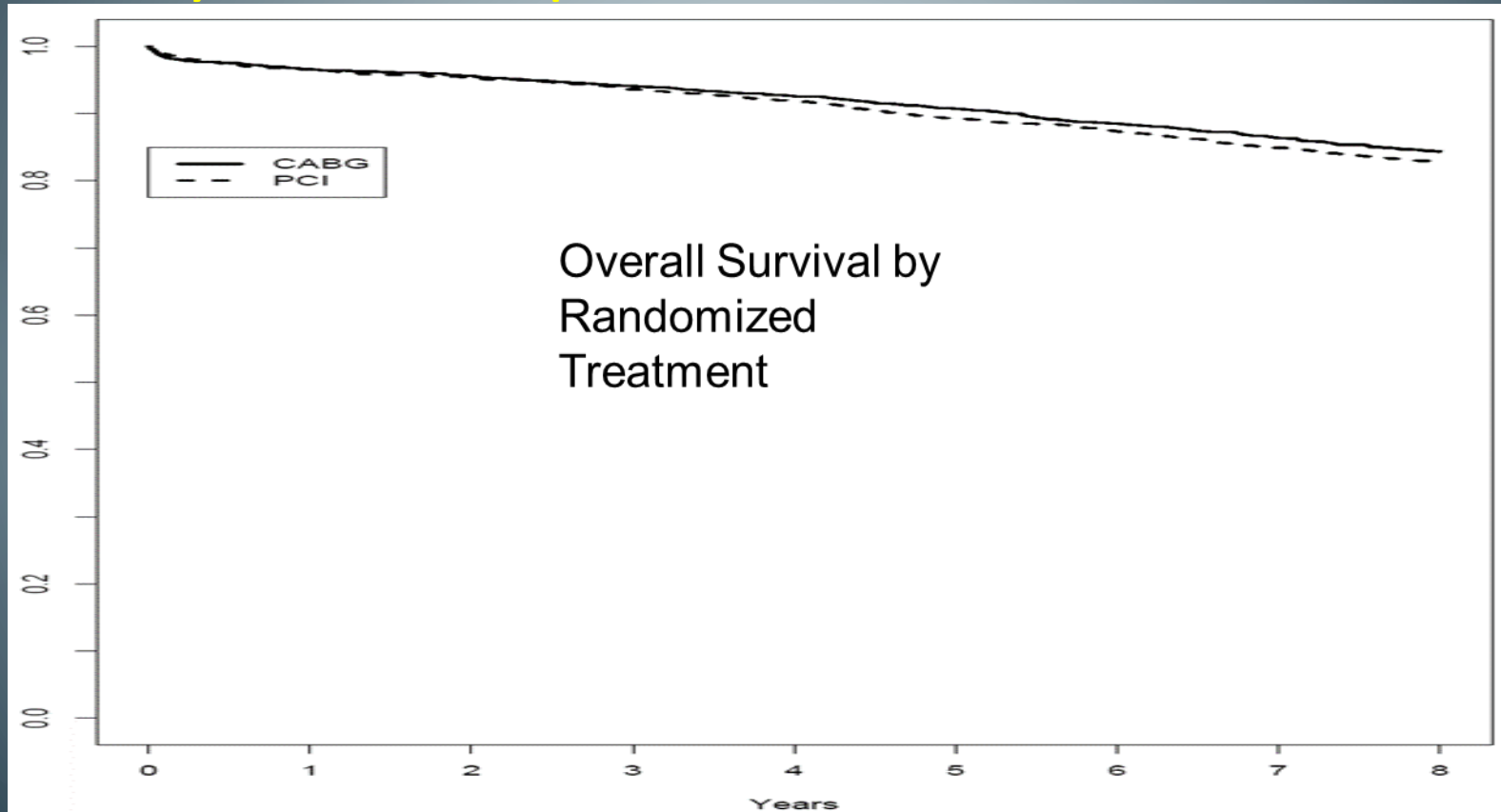
1150 *Circulation* September 9, 2008



complete revascularization was performed in 89.4% of the CABG patients compared with 62.0% of the PCI patients (p=0.001)

Group	0	365	730	1095	1460	1825	Group	0	365	730	1095	1460	1825
PCI	1518	1472	1456	1440	1406	1347	PCI	1518	1381	913	896	872	846
CABG	1533	1479	1457	1439	1412	1349	CABG	1533	1377	908	891	868	845

Coronary artery bypass surgery compared with percutaneous coronary interventions for multivessel disease: a collaborative analysis of individual patient data from ten randomised trials



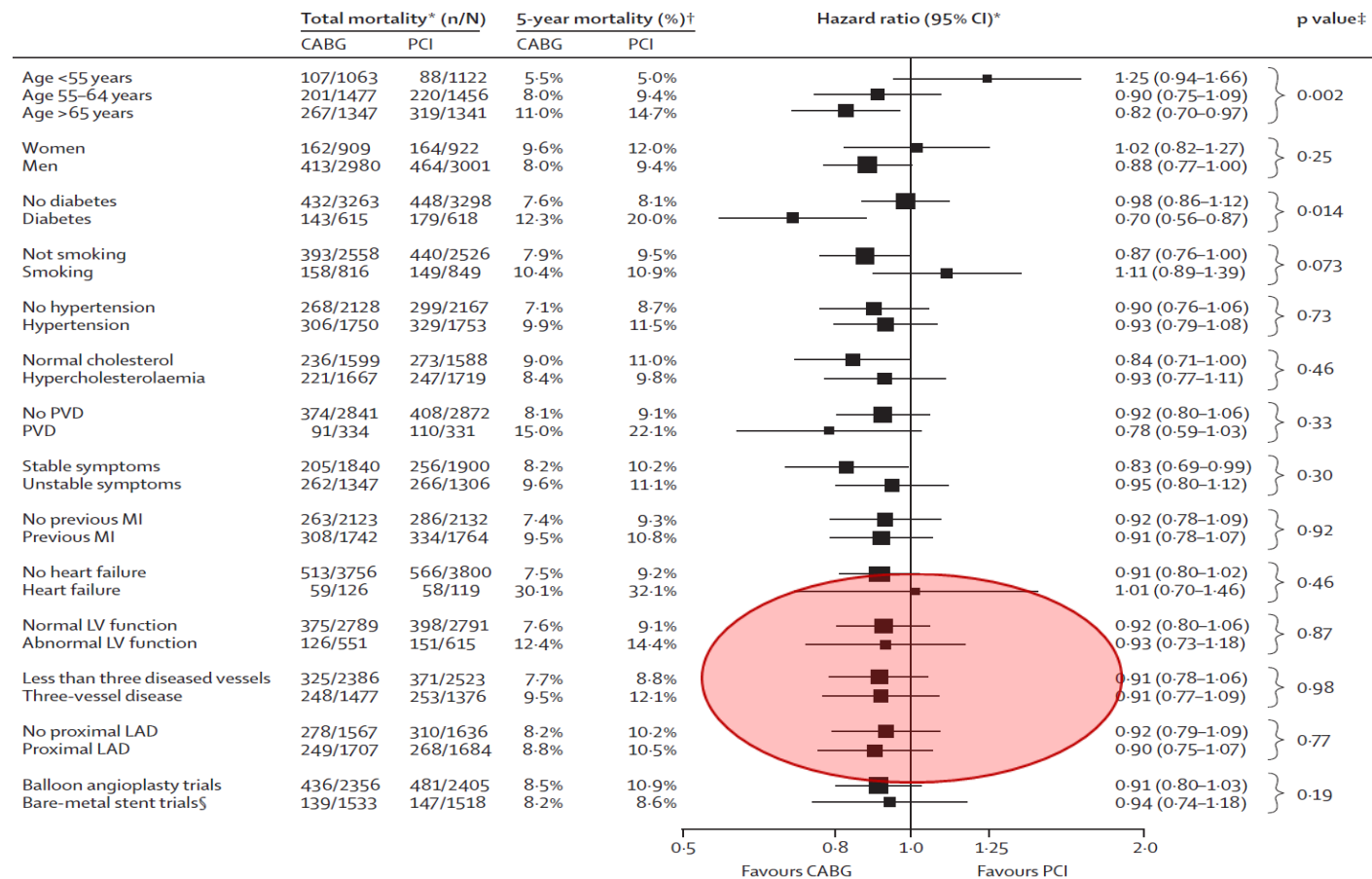


Figure 2: Subgroup analyses for mortality after treatment with coronary artery bypass graft or percutaneous coronary intervention

Major Results of PCI vs CABG Trials in MVD

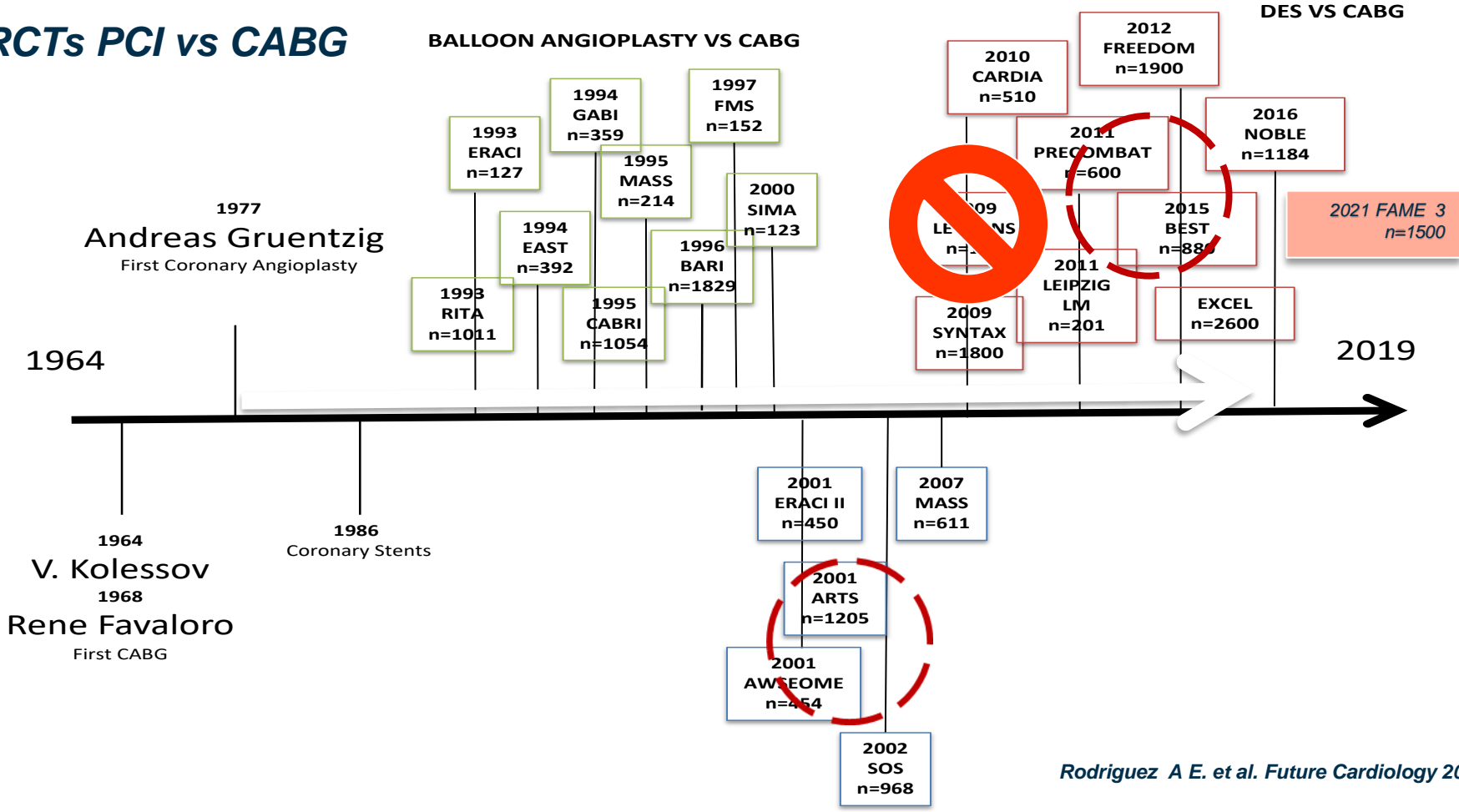
(10 RCT no DES era)

- # ARTS: Equipoise PCI & CABG
- # **BARI: Negative to PCI**
- # CABRI: Equipoise PCI & CABG
- # EAST: Equipoise PCI & CABG
- # ERACI II: Equipoise PCI & CABG
- # GABI: Equipoise PCI & CABG
- # MASS II: Equipoise PCI/CABG
- #: RITA : Equipoise PCI/CABG
- # **SoS: Negative to PCI.**
- #Toulouse: Equipoise PCI/CABG

RCTs PCI vs CABG

BALLOON ANGIOPLASTY VS CABG

DES VS CABG



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BMS VS CABG

THE LANCET

INDIVIDUAL PATIENT-DATA POOLED ANALYSIS OF 11,518 PATIENTS FROM 11 RANDOMIZED TRIALS

Mortality after coronary artery bypass grafting versus percutaneous coronary intervention with stenting for coronary artery disease: a pooled analysis of individual patient data



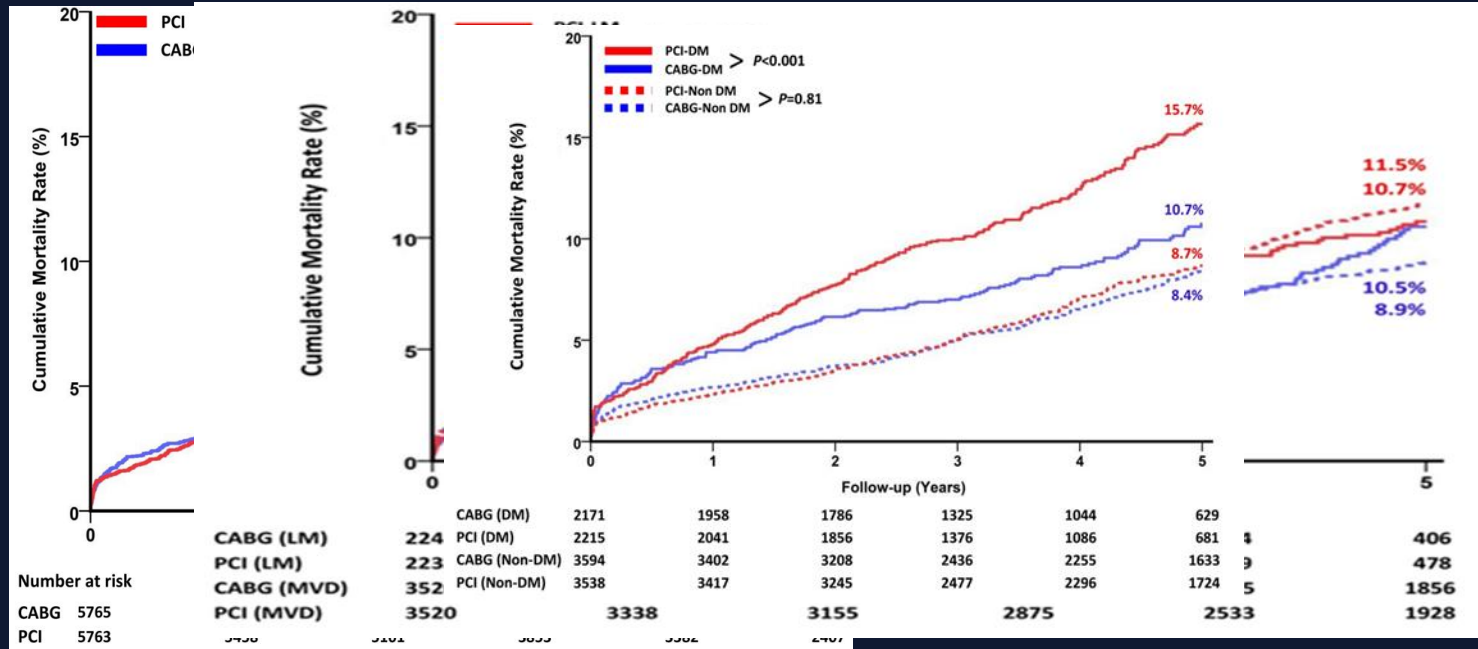
Stuart J Head, Milan Milojevic, Joost Daemen, Jung-Min Ahn, Eric Boersma, Ewald H Christiansen, Michael J Domanski, Michael E Farkouh, Marcus Flather, Valentin Fuster, Mark A Hlatky, Niels R Holm, Whady A Hueb, Masoor Kamalesh, Young-Hak Kim, Timo Mäkikallio, Friedrich W Mohr, Grigorios Papageorgiou, Seung-Jung Park, Alfredo E Rodriguez, Joseph F Sabik 3rd, Rodney H Stables, Gregg W Stone, Patrick W Serruys, Arie Pieter Kappetein

Summary

Background Numerous randomised trials have compared coronary artery bypass grafting (CABG) with percutaneous coronary intervention (PCI) for patients with coronary artery disease. However, no studies have been powered to detect a difference in mortality between the revascularisation strategies.

Published Online
February 22, 2018
[http://dx.doi.org/10.1016/S0140-6736\(18\)30423-9](http://dx.doi.org/10.1016/S0140-6736(18)30423-9)

Mortality Benefit with CABG over PCI with Stents



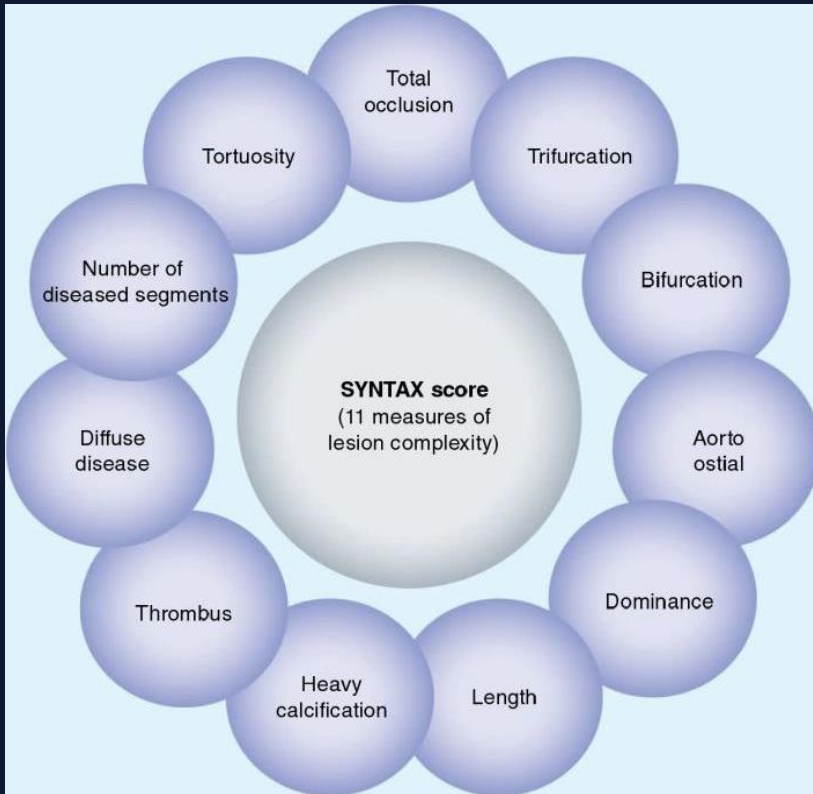
SJ Head et al, Lancet 2018

Major Results of DES vs CABG Trials

(MVD and LMCA)

- **#VA-CARDIA: Negative to PCI**
- **#FREEDOM: Negative to PCI**
- **#SYNTAX: Negative to PCI**
- **#PRE-COMBAT: Equipose PCI & CABG**
- **#BEST: Negative to PCI**
- **# NOBLE: Negative to PCI**
- **# EXCEL: Negative to PCI**
- **#FAME 3: Negative to PCI**

The **SYNTAX** lesion score is calculated by grading 11 types of lesions by answering sequential interactive questions



YES: Non Guided.

-Intermediate (50 to 69%) or Severe Stenosis ($\geq 70\%$) with RD ≥ 1.5 mm)



- **Goal: Complete Revascularization**

Table 1. Completeness of revascularization in randomized clinical trials.

Trials	CABG patients (n)	PCI patients (n)	CABG complete revascularization	PCI complete revascularization	p-value
EAST	194	198	99%	75%	0.002
ARTS	605	600	84.1%	70.5%	0.001
ERACI	64	63	88%	51%	0.001
CABRI	513	541	82%	59%	0.001
RITA	501	510	97%	81%	0.003
MASS II	203	205	74%	41%	0.001
SYNTAX	897	903	63%	57%	0.005
ERACI II	225	225	85%	50%	0.002
BEST	442	438	72%	51%	<0.001
NOBLE	564	592	95%	92%	0.53
EXCEL	957	948	n/a	n/a	n/a
PRECOMBAT	300	300	70.3%	68.3%	0.60

CABG: Coronary artery bypass graft; PCI: Percutaneous coronary intervention.

Data taken from [4,5,7–11].

Late Adverse Events in DES Era

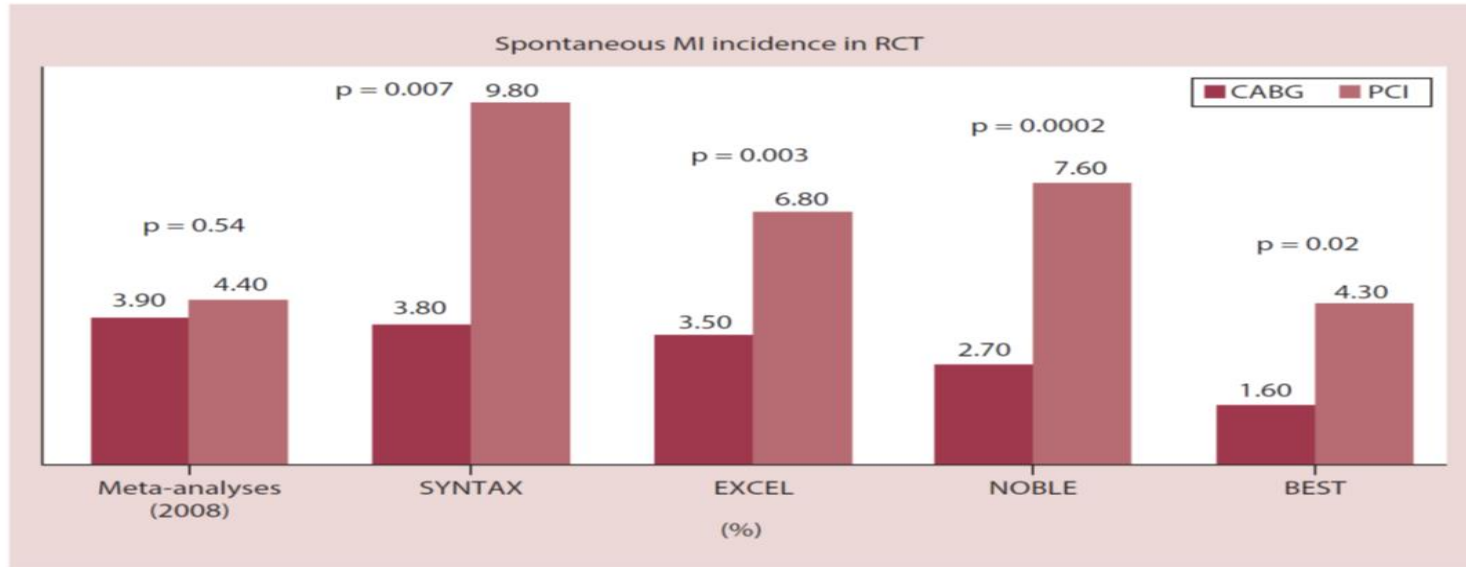


Figure 5. Spontaneous myocardial infarction incidence in randomized controlled trials and a meta-analysis. CABG: Coronary artery bypass graft; MI: Myocardial infarction; PCI: Percutaneous coronary intervention; RCT: Randomized clinical trial. Data taken from [7–10,16,19,20].

Rodriguez A E. et al. *Future Cardiology* 2020

CONCLUSIONS

- Over a 5-years follow up, no significant differences in all-cause death emerged between percutaneous and surgical revascularization in patients with ULM disease. Nevertheless, CABG was associated with a lower risk of major adverse cardiovascular events, in particular revascularization and myocardial infarction.

Lancet 2019 DES 2 vs BMS

(26616 pts -20 RCT)

- DES2 vs BMS 5 years FU
- All cause of death:
- 9.8% vs 10.4% p=0.400
- Cardiac death:
- 4.6% vs 4.9% p=0.116
- TVR,TVR-MI and definite ST lower with DES

	Drug-eluting stents (n=14 070)	Bare-metal stents (n=12 546)	Hazard ratio (95% CI)	p value	τ
Longest available follow-up					
Cardiac death or MI	1371 (14.5%)	1472 (16.7%)	0.84 (0.78–0.90)	<0.001	0.003
All-cause death	1031 (11.0%)	996 (12.0%)	0.96 (0.88–1.05)	0.358	0.004
Cardiac death	494 (4.8%)	503 (5.8%)	0.89 (0.78–1.01)	0.075	0.003
MI	1020 (11.7%)	1124 (13.6%)	0.79 (0.71–0.88)	<0.001	0.070
Target-vessel revascularisation	920 (9.6%)	1448 (15.0%)	0.55 (0.50–0.60)	<0.001	0.003
Definite stent thrombosis	125 (1.2%)	173 (1.7%)	0.63 (0.50–0.80)	<0.001	0.008
5 years of follow-up					
Cardiac death or MI	1345 (12.5%)	1446 (14.2%)	0.83 (0.78–0.90)	<0.001	0.003
All-cause death	1013 (9.8%)	974 (10.4%)	0.95 (0.88–1.05)	0.400	0.004
Cardiac death	490 (4.6%)	492 (4.9%)	0.90 (0.79–1.03)	0.116	0.003
MI	994 (9.6%)	1099 (11.0%)	0.78 (0.72–0.88)	<0.001	0.056
Target-vessel revascularisation	904 (8.4%)	1436 (13.4%)	0.54 (0.50–0.59)	<0.001	0.003
Definite stent thrombosis	123 (1.1%)	171 (1.6%)	0.63 (0.50–0.80)	<0.001	0.008
1-year follow-up					
Cardiac death or MI	829 (6.0%)	989 (8.0%)	0.74 (0.67–0.81)	<0.001	0.003
All-cause death	499 (3.5%)	495 (4.0%)	0.94 (0.81–1.04)	0.197	0.003
Cardiac death	301 (2.2%)	331 (2.7%)	0.82 (0.70–0.96)	0.016	0.003
MI	591 (4.3%)	746 (6.0%)	0.69 (0.62–0.78)	<0.001	0.070
Target-vessel revascularisation	547 (4.0%)	1073 (8.8%)	0.43 (0.39–0.48)	<0.001	0.015
Definite stent thrombosis	83 (0.6%)	137 (1.1%)	0.52 (0.40–0.69)	<0.001	0.008

MI=myocardial infarction.

#Piccolo R, Valgimigli M, Rodriguez AE et al Lancet June 2019,
 # Piccolo R, Valgimigli M, Rodriguez AE et al J Am Am Heart Assoc
 October 2021.

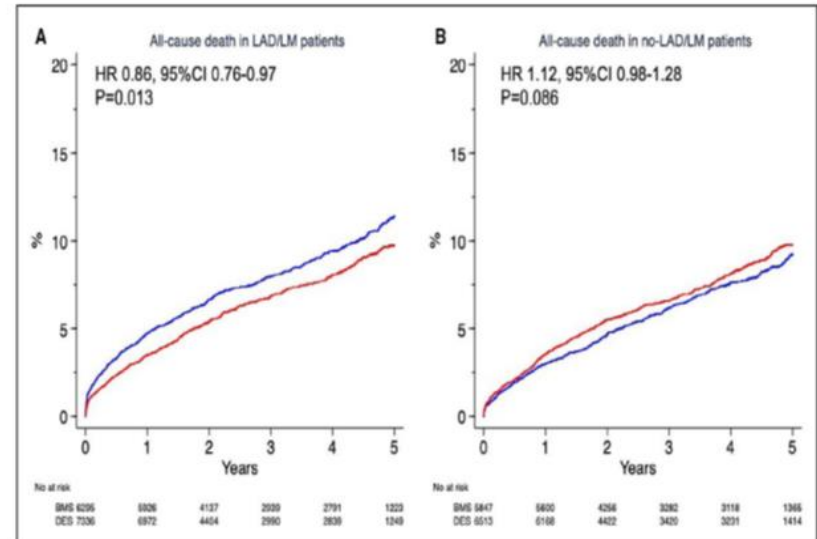
DES 2 vs BMS RCT

Piccolo et al

New-Generation DES for PCI in LAD/LM Arter

5-years follow-up

Cardiac death or MI						
LAD/LM	698 (12.63)	784 (15.03)	■	0.76 (0.68 to 0.86)	<0.001	0.037
No-LAD/LM	623 (12.16)	619 (12.99)	■	0.92 (0.82 to 1.04)	0.184	
All-cause death						
LAD/LM	506 (9.73)	540 (11.43)	■	0.85 (0.75 to 0.97)	0.012	0.003
No-LAD/LM	488 (9.77)	407 (9.22)	■	1.14 (1.00 to 1.30)	0.059	
Cardiac death						
LAD/LM	263 (4.75)	283 (5.29)	■	0.83 (0.70 to 0.99)	0.039	0.115
No-LAD/LM	219 (4.29)	196 (4.25)	■	1.05 (0.86 to 1.28)	0.636	
Myocardial infarction						
LAD/LM	516 (9.72)	591 (11.71)	■	0.74 (0.65 to 0.85)	<0.001	0.116
No-LAD/LM	467 (9.38)	482 (10.27)	■	0.87 (0.76 to 1.00)	0.056	
TVR						
LAD/LM	492 (8.78)	773 (14.30)	■	0.53 (0.47 to 0.59)	<0.001	0.479
No-LAD/LM	391 (7.74)	607 (12.04)	■	0.55 (0.48 to 0.62)	<0.001	
Definite stent thrombosis						
LAD/LM	72 (1.15)	102 (1.92)	■	0.61 (0.44 to 0.84)	0.002	0.841
No-LAD/LM	48 (0.97)	66 (1.27)	■	0.62 (0.42 to 0.91)	0.014	



#Piccolo R, Valgimigli M, Rodriguez AE et al Lancet June 2019,
Piccolo R, Valgimigli M, Rodriguez AE et al J Am Am Heart Assoc
October 2021.

Comparison of SYNTAX score strata effects of percutaneous and surgical revascularization trials: A meta-analysis

Comparison of between-strata effects of percutaneous and surgical revascularization trials: a meta-analysis focusing on angiographic score groups

METHODS

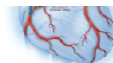
Systematic review and pairwise meta-analysis:
6 randomized trials (8269 patients) of PCI vs CABG reporting outcomes



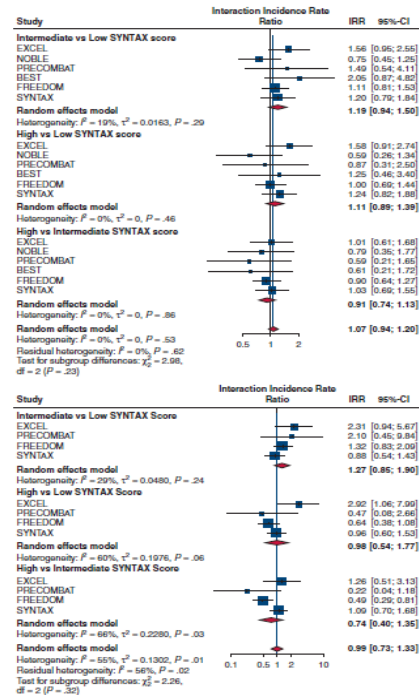
CONCLUSIONS

We found no association between the SYNTAX score and the outcome of the trials comparing PCI and CABG. Our findings have implications for clinical practice, as well as future guidelines and the design of trials comparing PCI and CABG. The use of the SYNTAX score as the primary approach to stratify patients with coronary artery disease and to identify the most appropriate revascularization method in the individual patient is not supported by the current evidence.

High vs Intermediate SYNTAX score (PCI vs CABG), OR (95% CI) = 1.07 (0.48, 2.43), $P = .86$



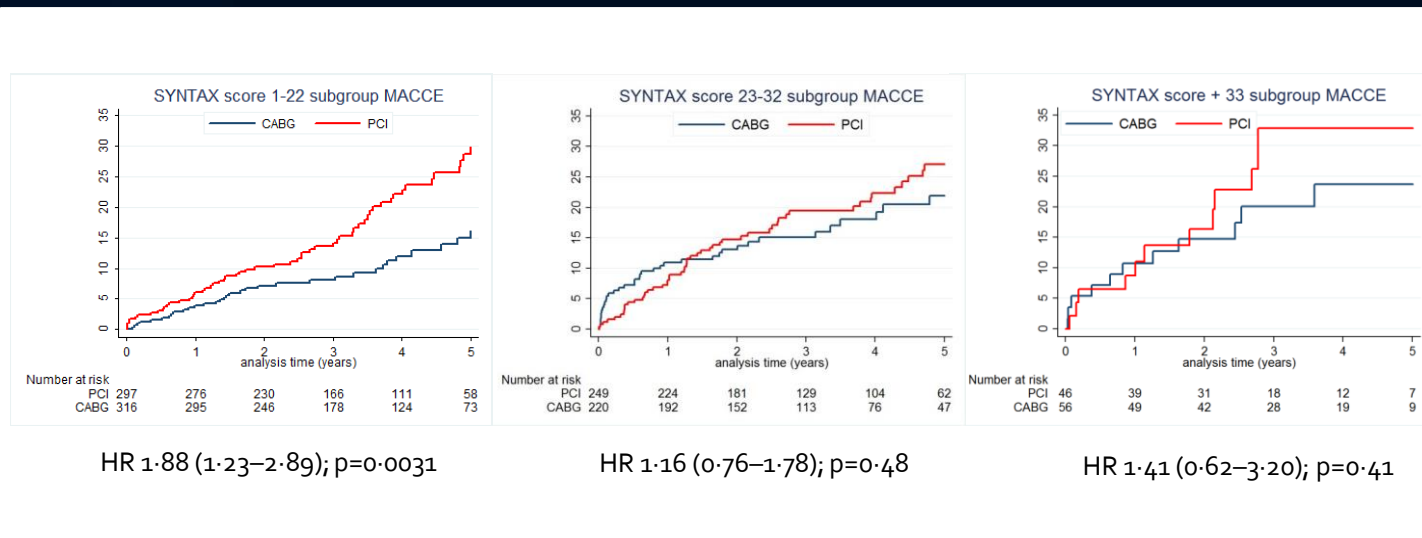
CABG, coronary artery bypass grafting; CI, confidence interval; IRR, incidence rate ratios;
MACCE, major adverse cardiac and cerebrovascular events; PCI, percutaneous coronary intervention;
SYNTAX, Synergy Between Percutaneous Coronary Intervention With TAXUS and Cardiac Surgery.



Results

SYNTAX score subgroups

K-M estimates



SYNTAX score assessed by independent corelab

Variables Anatómicas



Score Syntax

**Revascularización “no guiada”,
considera:**

- Lesiones intermedias(50-69%)
- Lesiones severas en vasos con diámetro < 2 mm

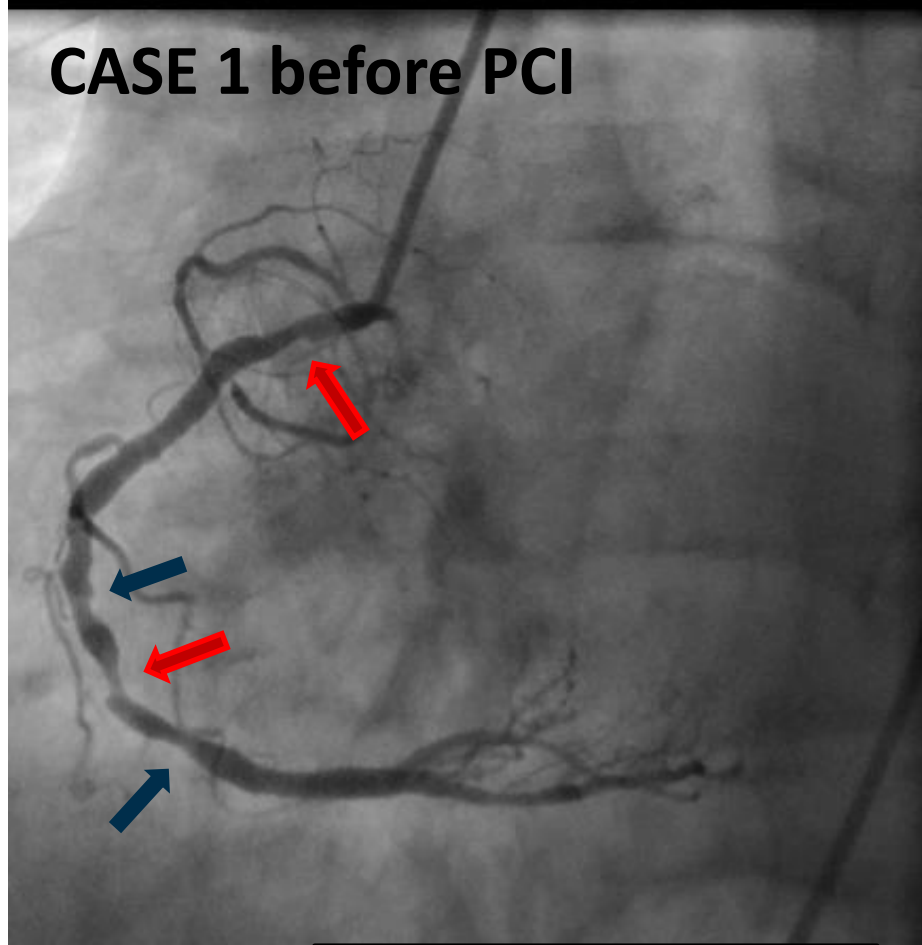
VERSUS

**Score Syntax modificado por
ERACI**

**Revascularización “guiada”,
considera:**

- Estenosis severa ($\geq 70\%$) con diámetro ≥ 2.0 mm)

CASE 1 before PCI

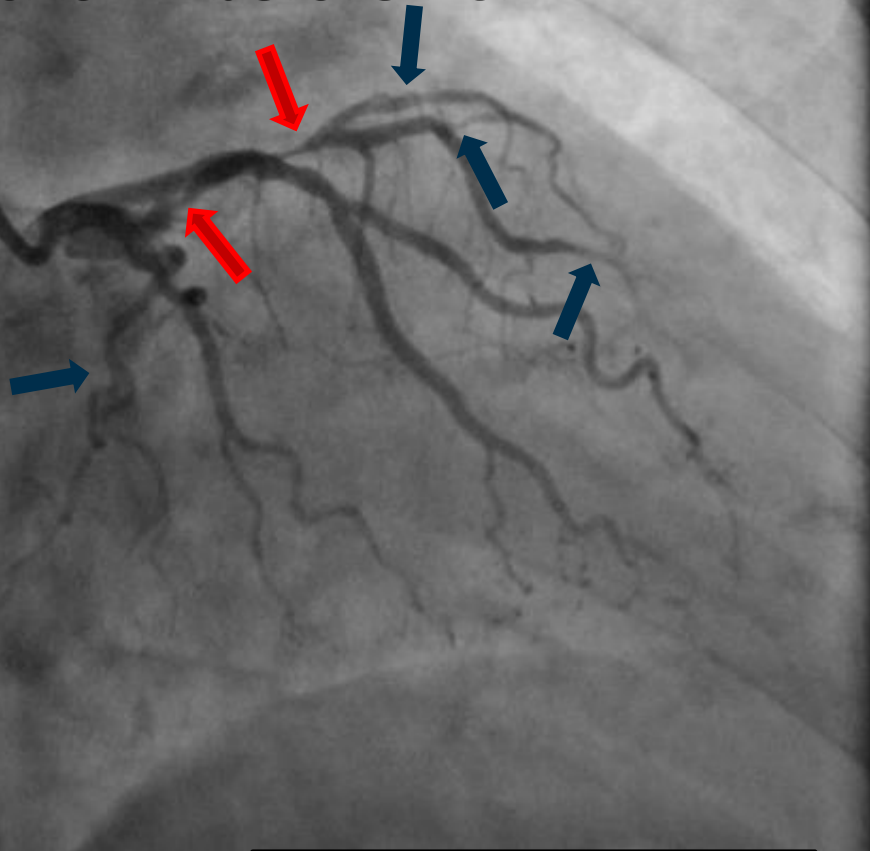


Score SYNTAX Score = 32
(White and Red Arrows) 4 DES

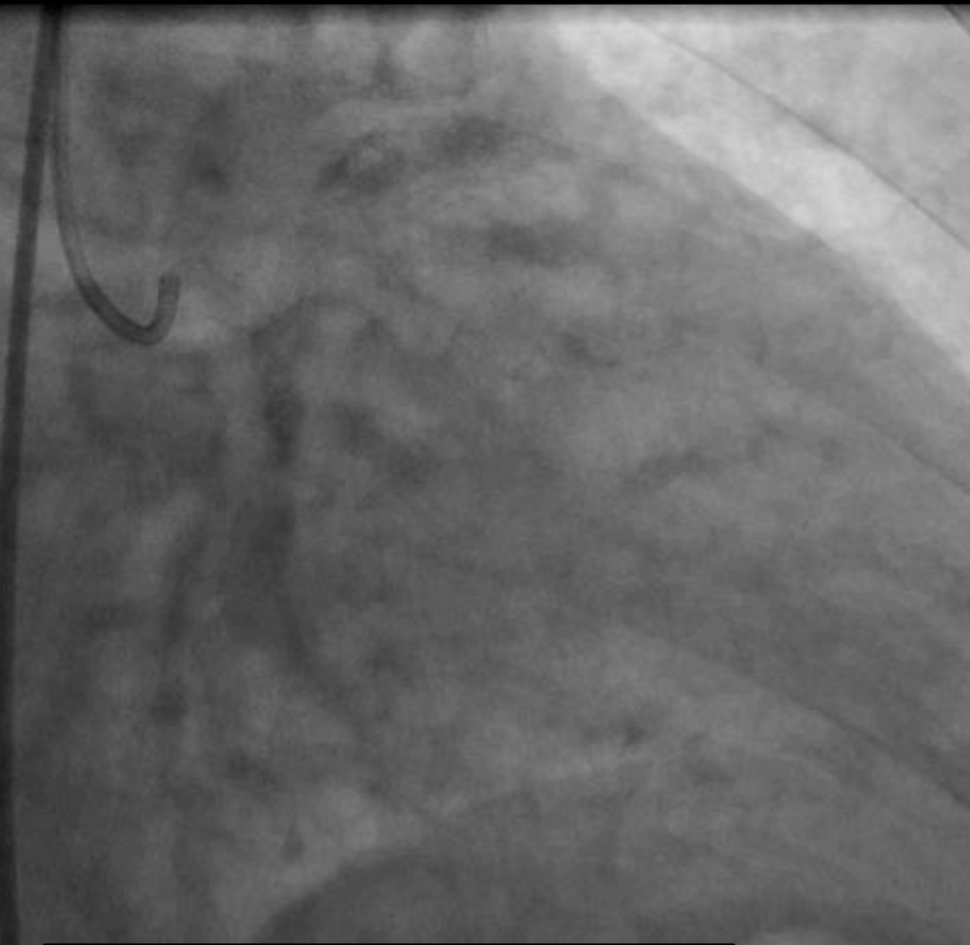


Modified by ERACI IV SYNTAX Score =15
(Red Arrows) 2 DES

CASE 1 before PCI

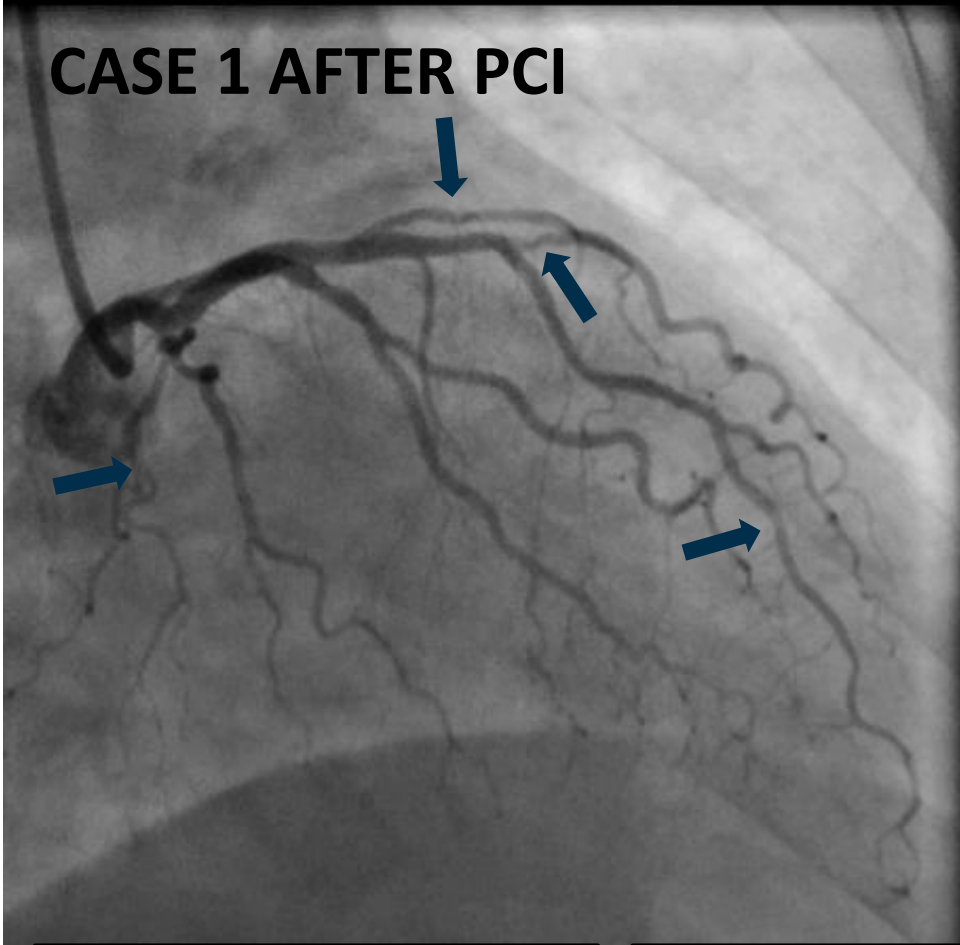


Score SYNTAX Score = 32
(White and Red Arrows) 4 DES



Modified by ERACI IV SYNTAX Score =15
(Red Arrows) 2DES

CASE 1 AFTER PCI

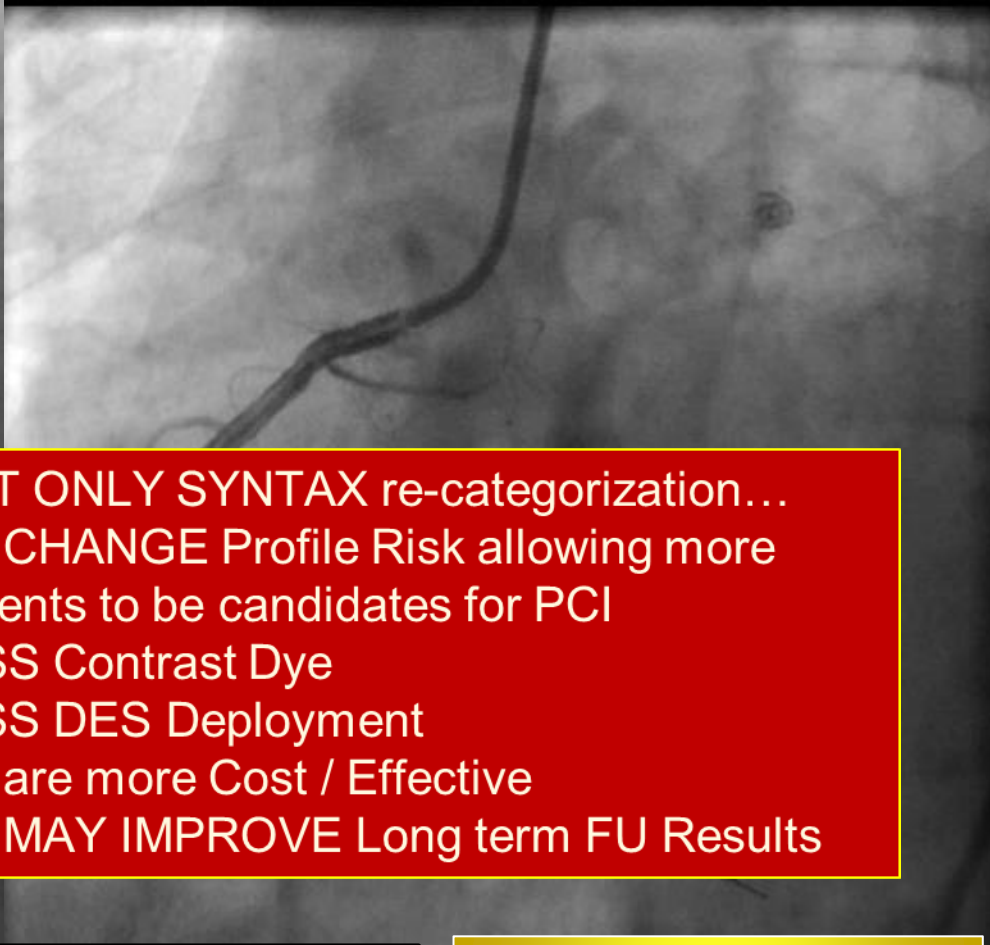
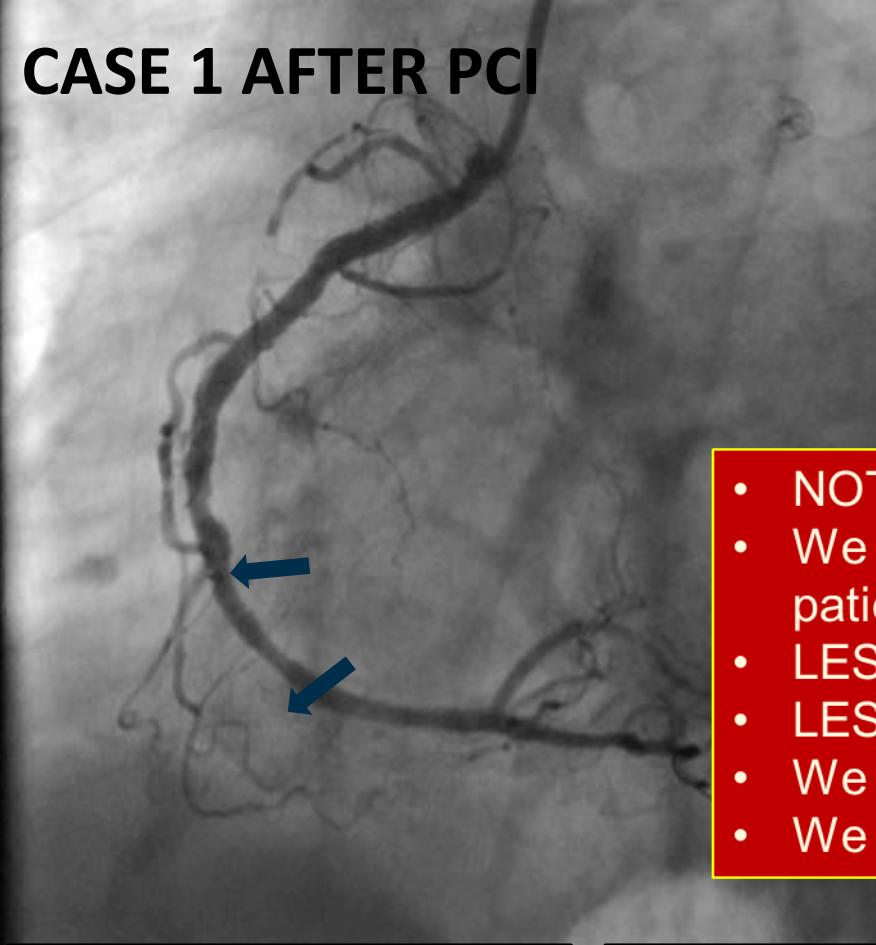


Score SYNTAX Score = 32
(White and Red Arrows) 4 DES

Modified by ERACI IV SYNTAX Score =15
(Red Arrows) 2DES

Residual SYNTAX score = 7
Residual ERACI Score =0

CASE 1 AFTER PCI



- NOT ONLY SYNTAX re-categorization...
- We CHANGE Profile Risk allowing more patients to be candidates for PCI
- LESS Contrast Dye
- LESS DES Deployment
- We are more Cost / Effective
- We MAY IMPROVE Long term FU Results

Score SYNTAX Score = 32
(White and Red Arrows) 4 DES

Modified by ERACI IV SYNTAX Score =15
(Red Arrows) 2DES

Residual SYNTAX score = 7
Residual ERACI Score =0

SYNTAX II (FFR guided PCI) & ERACI IV (ES guided PCI) share similar study design and limitations (non-randomized, prospective registry and indirect retrospective comparison)

GOAL: Functional Revascularization!!!

MACCE Reduction at 5 years in SYNTAX II and ERACI IV was similar :

36.4% vs 21.5% $p < 0.001$ (SYNTAX I vs II) 46%

33.8% vs 18.7% $p < 0.001$ (ERACI III vs IV) 44%



Figure 3 Five-year clinical outcomes comparing the SYNTAX II study vs. the equipoise-derived SYNTAX I percutaneous coronary intervention cohort. Kaplan-Meier curves are shown for the SYNTAX II group (blue) and for the SYNTAX I percutaneous coronary intervention cohort (red).

Hombre de 59 años

ANTECEDENTES:

- Hipertensión Arterial
- Imágenes compatibles con lesiones isquémicas en RMN cerebral 2018
- Colectomía

MEDICACIÓN HABITUAL:

- Rosuvastatina 20 mg/día
- Aspirina 100 mg/día
- Nebivolol 5 mg/día
- Candesartan 16 mg/día
- Hidroclorotiazida 12,5 mg/día

ENFERMEDAD ACTUAL:

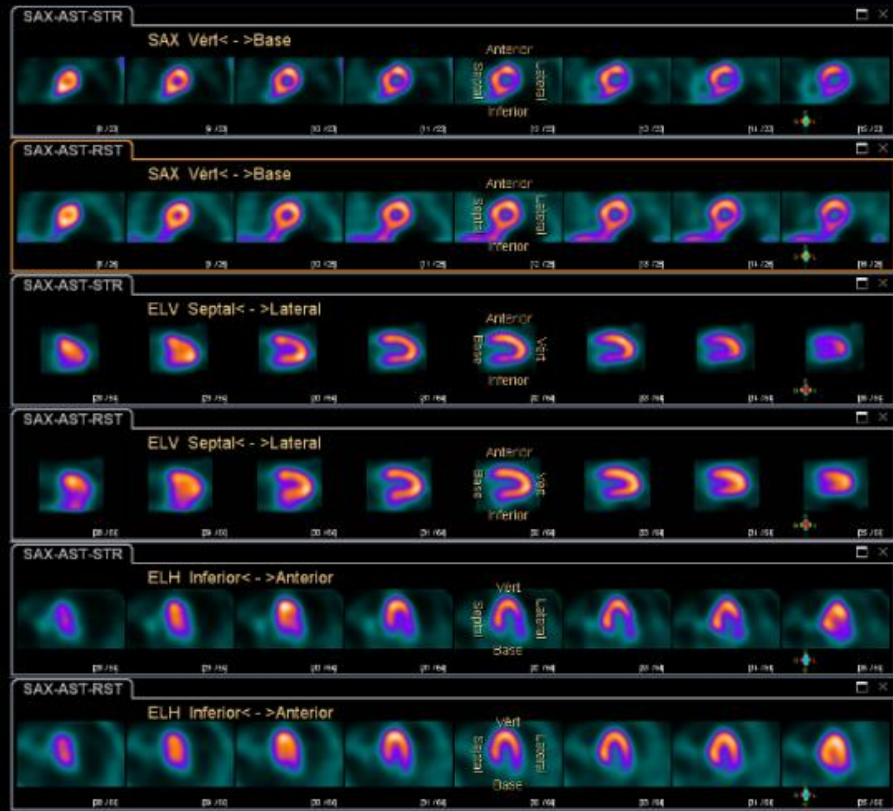
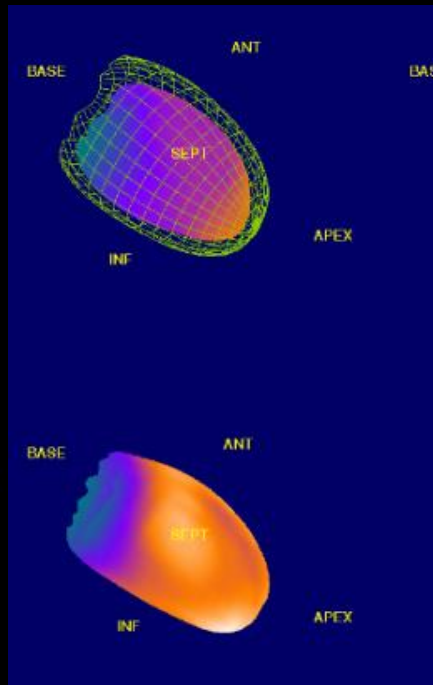
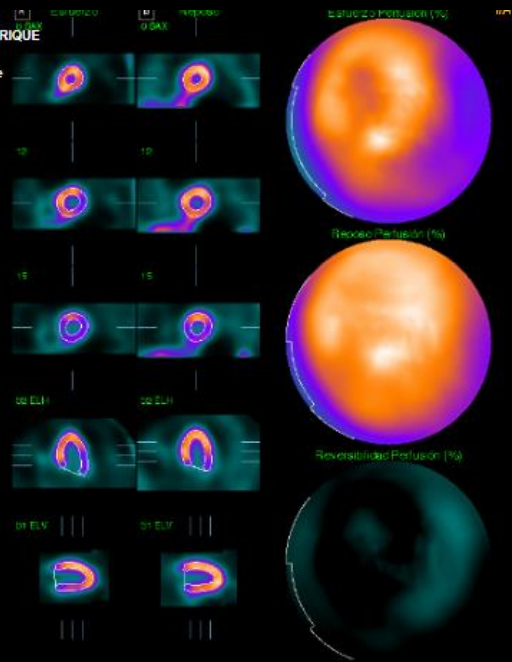
Paciente asintomático para angor o disnea ingresa de forma programada por presentar en estudio de perfusión miocárdica:

- Ergometria: Submáxima 93% de FCMT, ITT 27000, INFRA ST 1 mm V4 – V6.
- Spect: Hipoperfusión anterolateral (basal y medial) e inferolateral (basal y medial). Reversibles en reposo

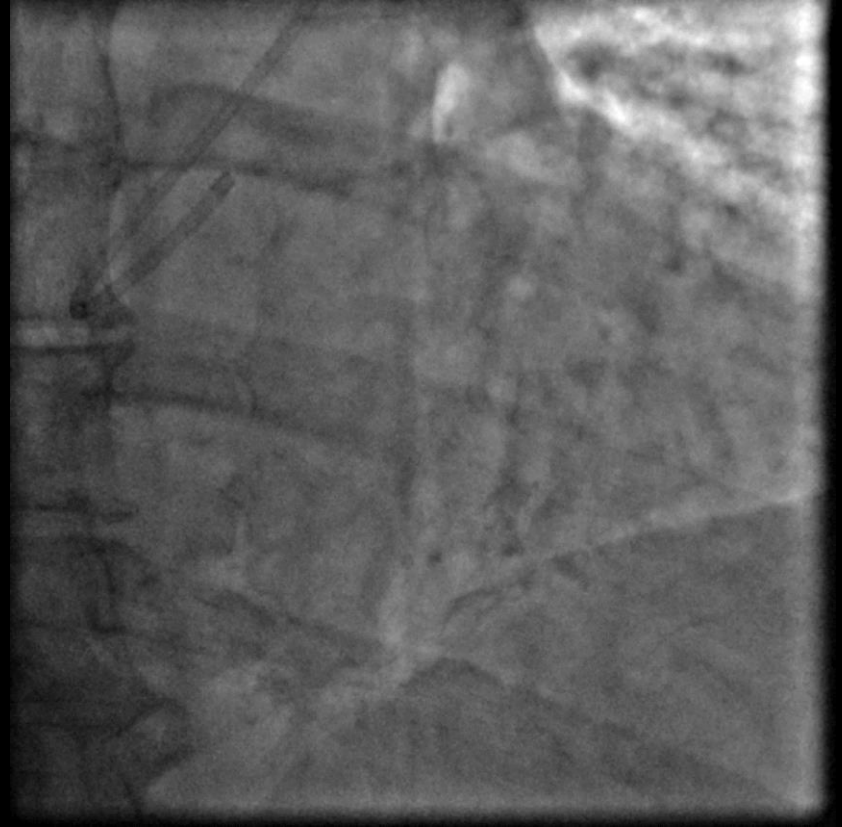
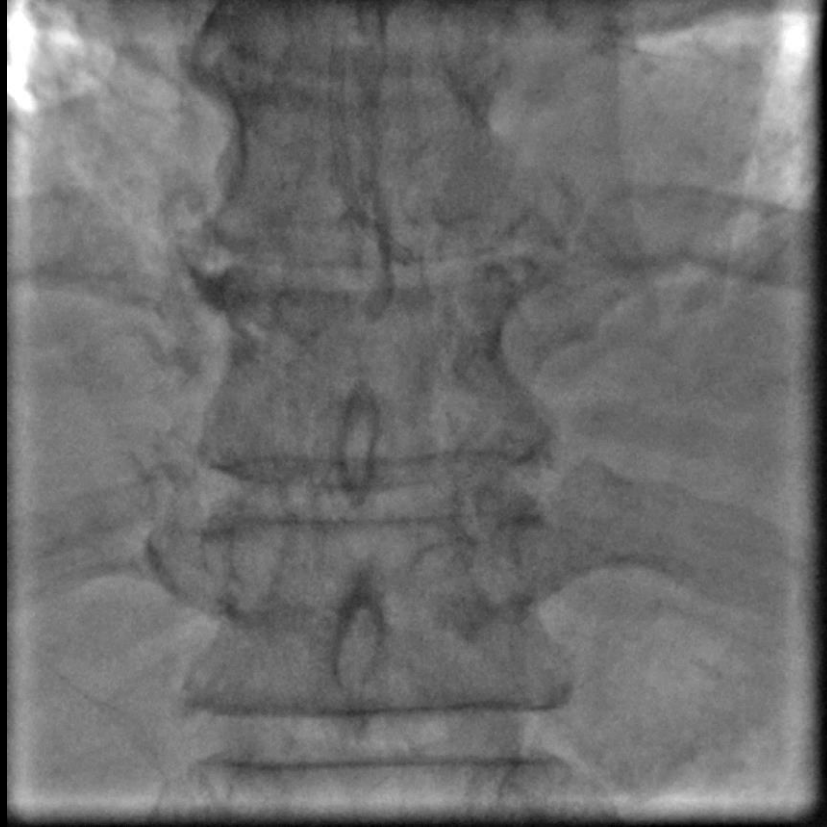
ISQUEMIA MODERADA EN TERRITORIO DE CIRCUNFLEJA



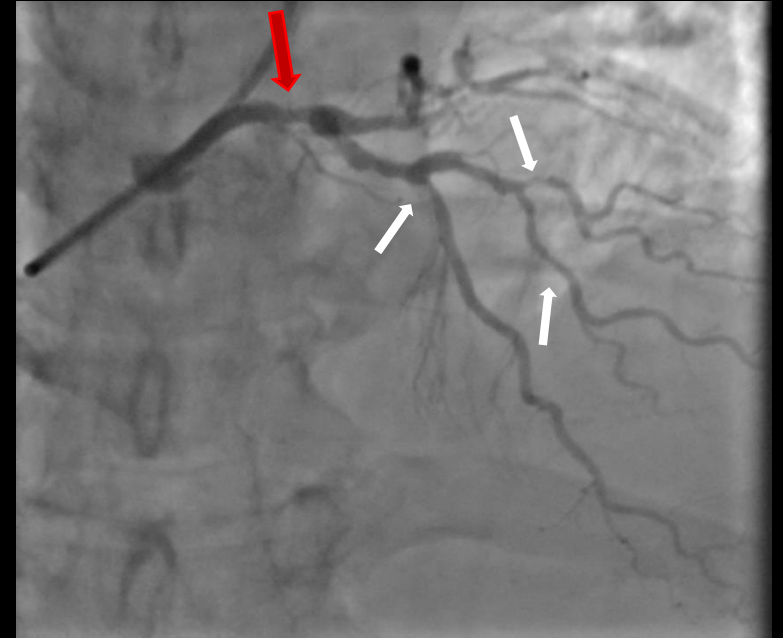
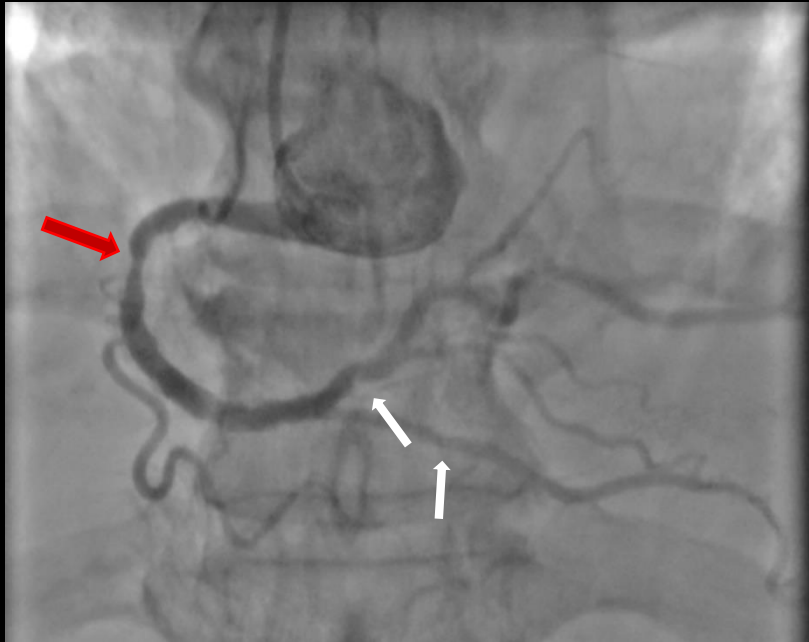
SPECT MIOCARDICO



CINCECORONARIOGRAFIA



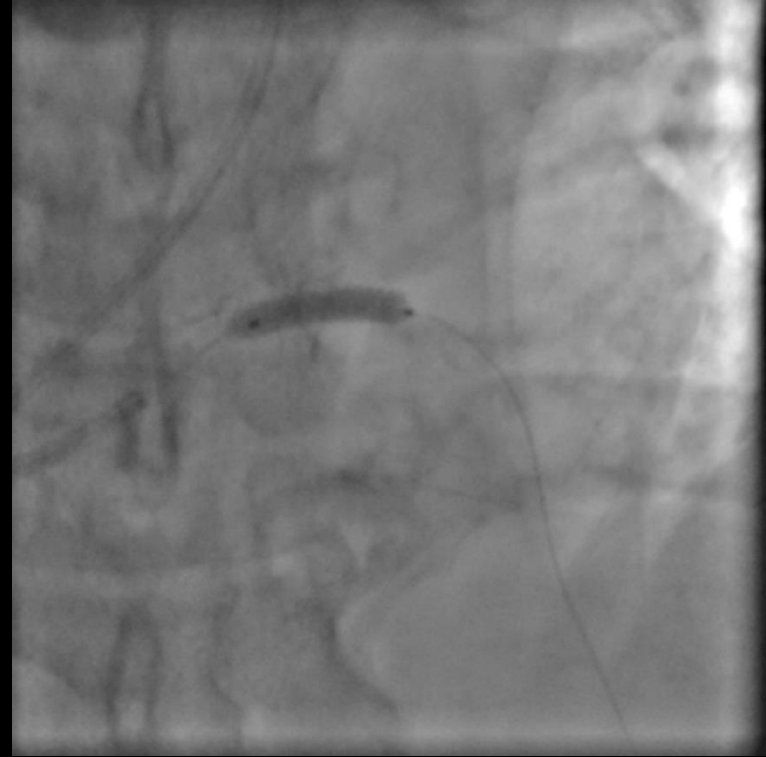
CINCECORONARIOGRAFIA



Score SYNTAX = 35
(Flechas rojas y blancas) 7 DES

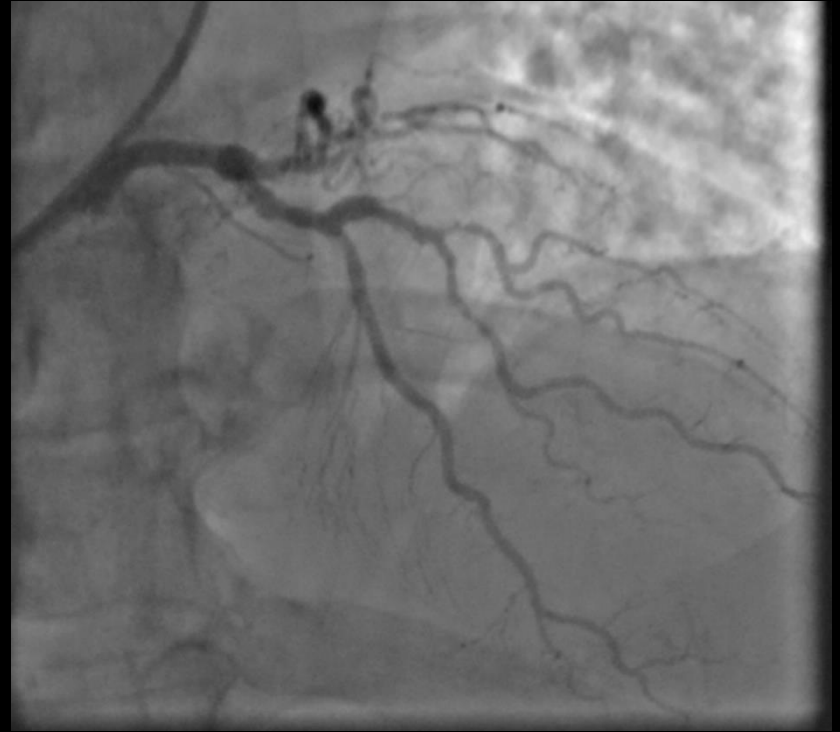
score SYNTAX modificado por ERACI =
18
(Flechas rojas) 2 DES

CINCECORONARIOGRAFIA



ATC + 1 DES a CD proximal y 1 DES de TCI a DA

CINCECORONARIOGRAFIA



Score Syntax residual = 18

Score SYNTAX residual modificado por ERACI = 0

stratified according to diabetes status and trial site. The major inclusion criterion was the presence of three-vessel coronary artery disease, defined as at least 50% diameter stenosis as assessed by visual estimation in each of the three major epicardial vessels or major side branches but not involving the left main coronary artery; the stenosis also needed to be amenable to revascularization by means of either PCI or CABG, as determined by the heart team at the trial site.

Procedural details for both groups are provided in Table 2. In the FFR-guided PCI group, the mean number of lesions per patient was 4, the mean number of drug-eluting stents implanted per patient was 3.7, and the median stented length was 80 mm. FFR was measured in 82% of lesions. The most common reasons for not measuring FFR were subtotally or completely occluded vessels. The mean FFR was 0.7

ABSTRACT

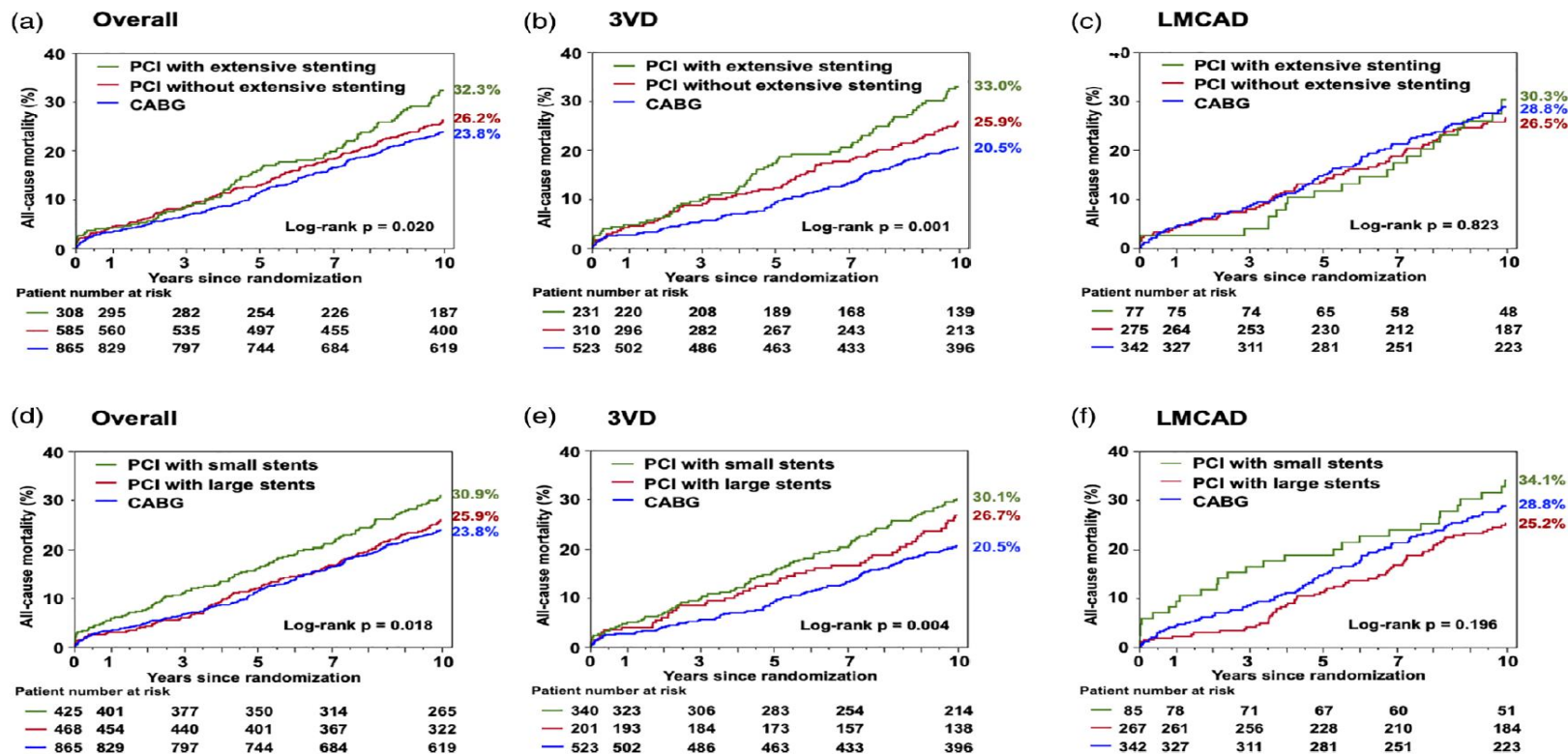


FIGURE 2 Kaplan–Meier curves for all-cause mortality at 10 years. (a–c) Mortality rates in patients with extensive stenting PCI, not-extensive stenting PCI and CABG. (a) The overall cohort. (b) Three-vessel disease (3VD) cohort. (c) Left main coronary artery disease (LMCAD) cohort. (d–f) Mortality rates in patients with small stenting PCI, large stenting PCI and CABG. (d) The overall cohort. (e) 3VD cohort. (f) LMCAD cohort. CABG, coronary artery bypass grafting surgery; PCI, percutaneous coronary intervention

BVS vasomotion 3-4 years FU (112 stents unpublished data)

Figure 2

Cardiovascular Diabetology 2006, 5:4

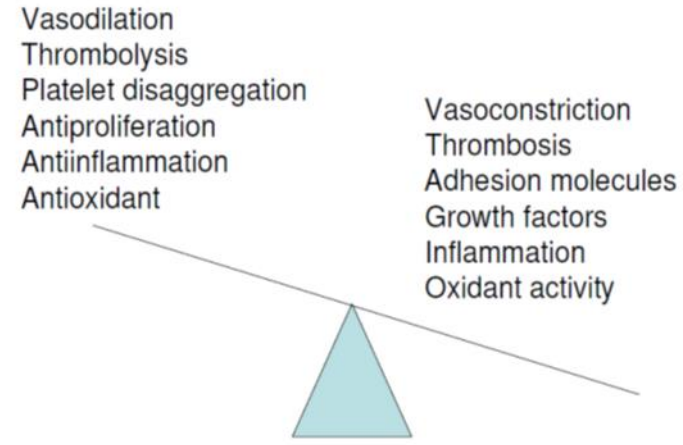
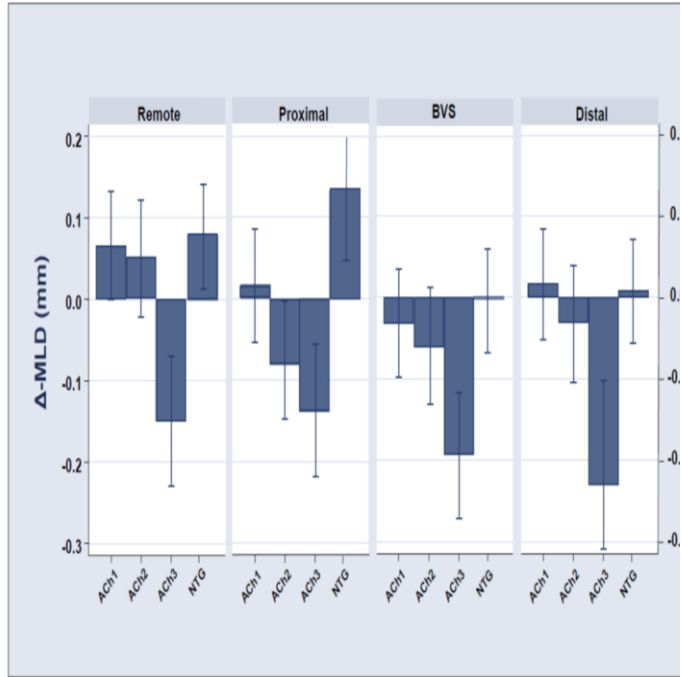


Figure 3